

SOFTWARE TECHNOLOGY FOR ADAPTABLE, RELIABLE SYSTEMS (STARS) PROGRAM

Technical Papers: Defining Manually Enactable Processes Using the Process Definition Information Organizer Templates

Contract No. F19628-93-C-0129
Task IV02 – Megaprogramming Transition Support

Prepared for:

Electronic Systems Center
Air Force Materiel Command, USAF
Hanscom AFB, MA 01731-2116



Prepared by:

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19950403 141

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9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Electronic Systems Center/ENS Air Force Materiel Command, USAF 5 Eglin Street, Building 1704 Hanscom Air Force Base, MA 01731-2116			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
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13. ABSTRACT (Maximum 200 words) This document consists of the presentation slides to be used as a tutorial at the 1995 SEPG Conference to be held in Boston, MA on May 22-25, 1995. This tutorial will cover planning for the definition of a project's processes, an approach for defining manually enactable processes, and an approach for evaluating process definition results.				
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Preface

This document was developed by the Loral Federal Systems - Gaithersburg, located at 700 North Frederick Avenue, Gaithersburg, MD 20879. Questions or comments should be directed to Mr. William H. Ett at 301-240-6337 (Internet: ettb@lfs.loral.com).

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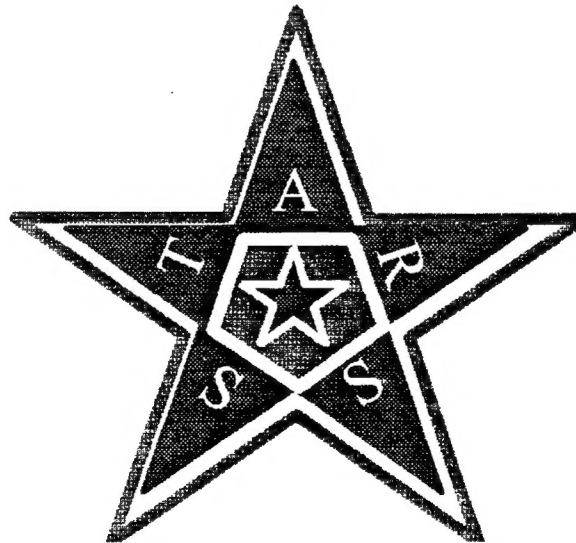
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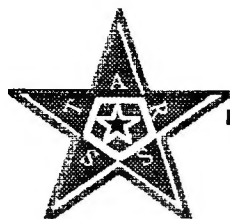
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1995 SEPG Conference
Boston, Massachusetts
May 22-25, 1995

Tutorial:
Defining Manually Enactable Processes
Using the Process Definition
Information Organizer Templates



Prepared by:
William H. Ett, Loral Federal Systems
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Support for the preparation of materials for this tutorial was provided by the ARPA Software Technology for Adaptable, Reliable Systems (STARS) Program under the Loral STARS V02 Technology Transition task. Support was also provided by Dick Phillips, Jim Over and Marc Kellner of the SEI, through the collaboration of the SEI's Process Definition Project with the STARS prime contractors and the STARS service demonstration projects. The authors would like to express their appreciation to John Foreman, STARS Program Manager, for his support of this tutorial.



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Defining Manually Enactable Processes Using the Process Definition Information Organizer Templates

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- ★ **1 - Introduction**
- 2 - Process Definition Concepts**
- 3 - Planning the Project Process**

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- 8 - Evaluating Process Definition Results**

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Introduction

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Who Should Be Here?

Professionals that:

- **Define and reuse processes that need to be both understandable and enactable (or executable)**
 - work, system, utility/service processes ...
- **Tailor organization processes to address the needs of their software development projects**
- **View processes as part of their transferrable knowledge base on how they expect to conduct business**

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What Will We Cover?

Planning for the definition of a project's processes

- Defining requirements for the project's process
- Defining the project's process architecture

An approach for defining manually enactable processes

- Laying out the process
- Describing methods, resources, and artifacts
- Describing the work actions of every enactable process
- Packaging the enactable process

An approach for evaluating process definition results

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What Will You Walk Away With?

Techniques that can be applied to:

- Plan your process definition efforts
- Define manually enactable processes
- Evaluate your process definitions

A copy of :

- *"Instructions for Process Definition Information Organizer Templates"*
- Template skeleton

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Agenda

- 08:00 AM Introduction**
- 08:10 AM Concepts and Process Definition Planning**
- 09:20 AM Process Context and Layout Specification**
- 10:30 AM Break**
- 10:40 AM Process Design & Enactment Specification**
- 11:40 AM Process Definition Evaluation**
- 11:55 AM Discussion**
- 12:00 PM Adjourn**

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Process Definition Concepts

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Process Definition Concepts

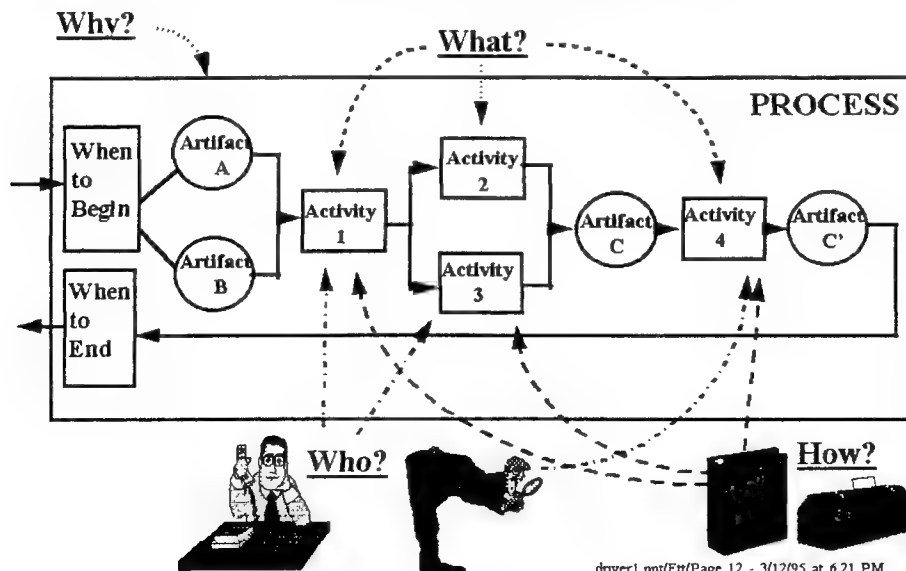
Concepts

- **Process Definition Elements**
 - Activities, Artifacts, Agents
 - Methods and Entry/Exit Criteria
- **Two Life Cycles Model for Process Definition**
- **Process Definition Activities**
- **Process Definition Products**

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Process Definition Elements



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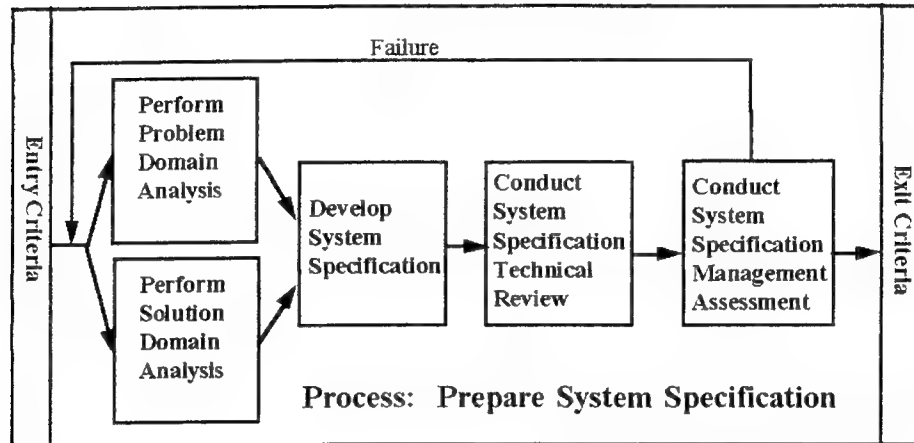


Process Context

Why?

Why *this* process?

- *What* are the requirements for the process?
- *What* is the purpose of the process?

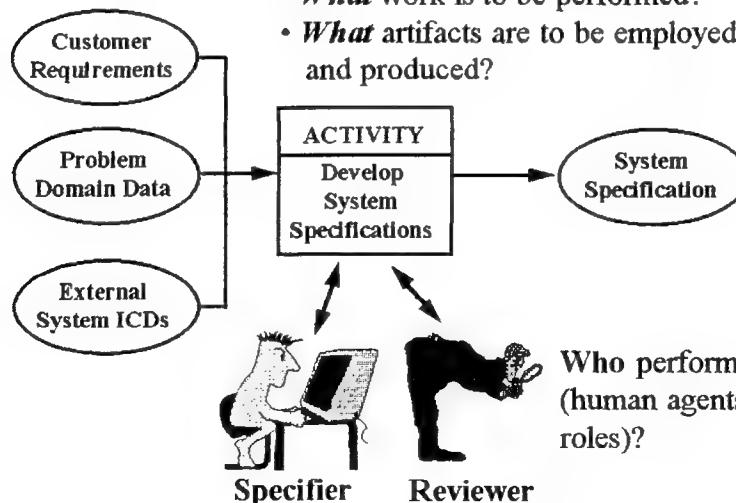


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Activities and Agents

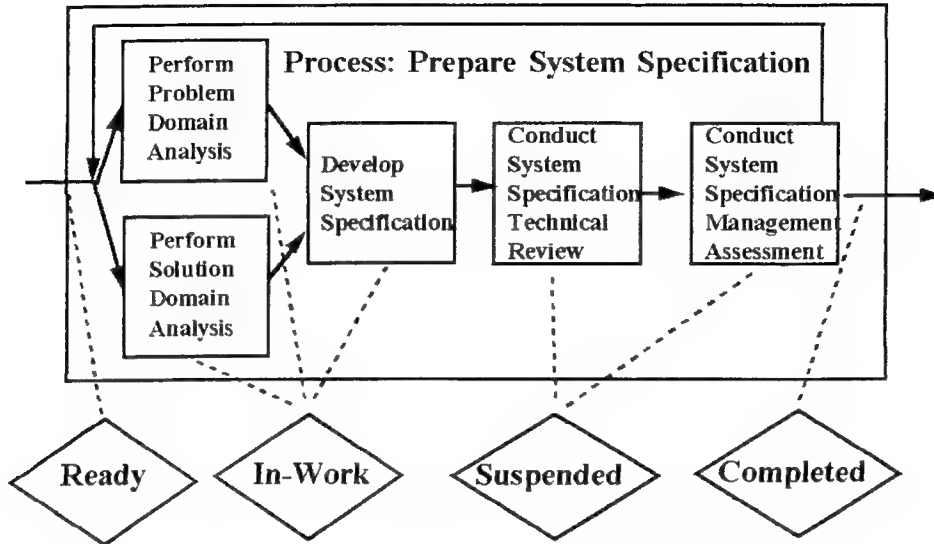
- *What* work is to be performed?
- *What* artifacts are to be employed and produced?



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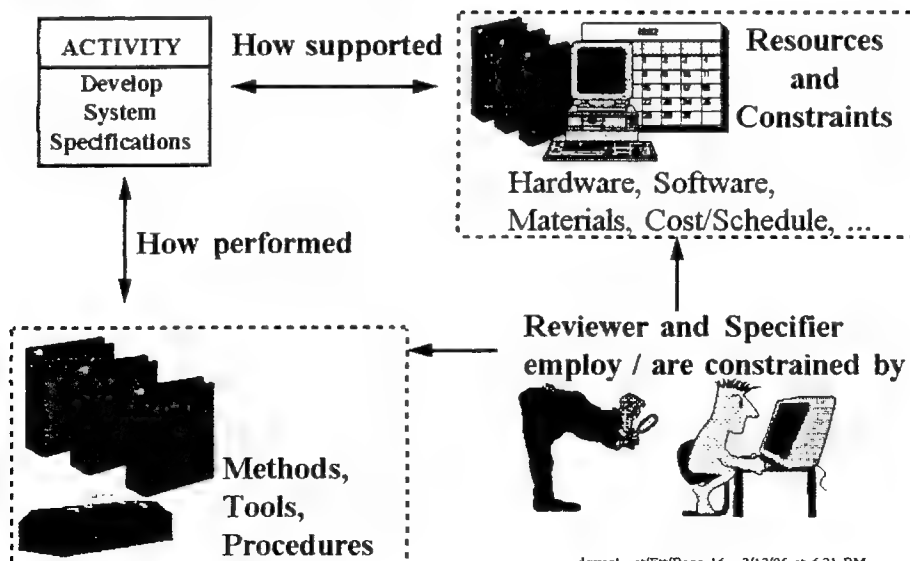
Activity States



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Methods and Resources



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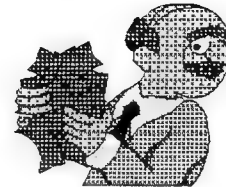


Entry/Exit Criteria

Conditions under which an *activity*:

1) should begin:

- Artifact states
- Completion of predecessor activities
- Resource availability



2) may be declared "complete:"

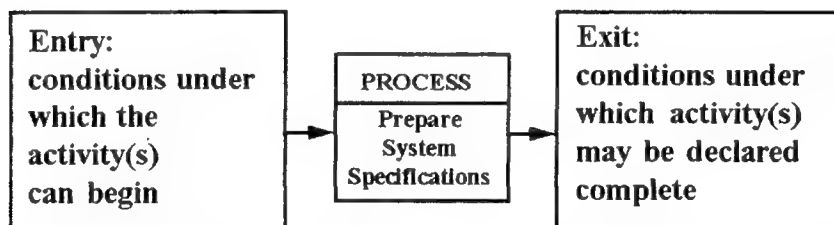
- Artifact states
- Completion of other related activities
- Returns from methods
- Checklist completion



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When



If "Customer Requirements"
and "External System ICDs"
are available,
Then
begin "Prepare System
Specifications"

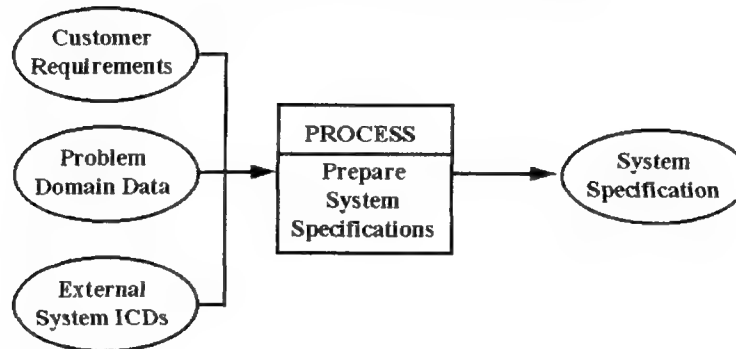
If "System Specifications"
has state of "approved,"
Then
log "Prepare System
Specifications"
as "completed"

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Artifacts

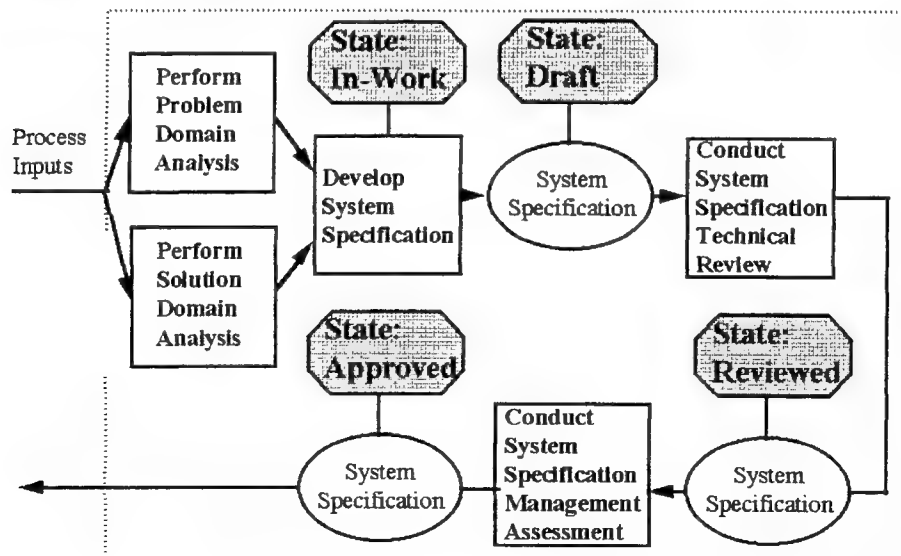
- Used or produced by a process
- Are activity inputs and outputs
- May have states and allowable state transitions



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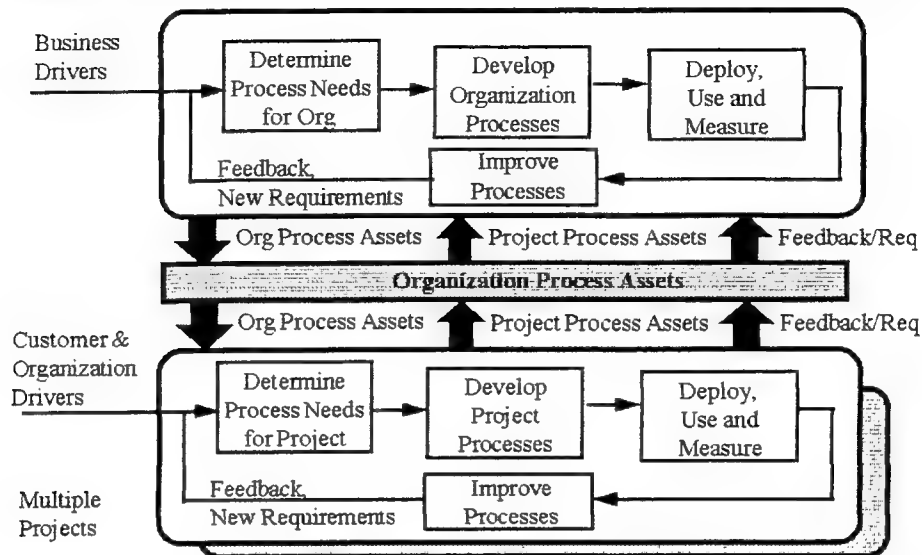
Artifact States



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Two Life Cycle Concept for Process Definition



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Why the Two Life Cycles for Process?

Organization Focus

- **Organization processes as "Product Line"**
 - Standard Business processes
 - Standard technical, service and utility processes
 - Process analysis and improvement
- **Processes defined to:**
 - Support the organization's business requirements
 - Ensure consistency and quality of products / work results
 - Address process assurance criteria required by customer set

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Why the Two Life Cycles for Process?

Project Focus

- **Project process concerns - Customer / Developer**
 - Processes that demonstrate developers can deliver
 - Processes that address customer's requirements
 - Processes that address customer's quality concerns
 - Processes that also address organization requirements
 - Processes must reflect how work is to be performed
 - Different application domains
 - Different domain and technical maturity
 - Technology adoption and use

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CMM V1.1 Mapping to Cleanroom

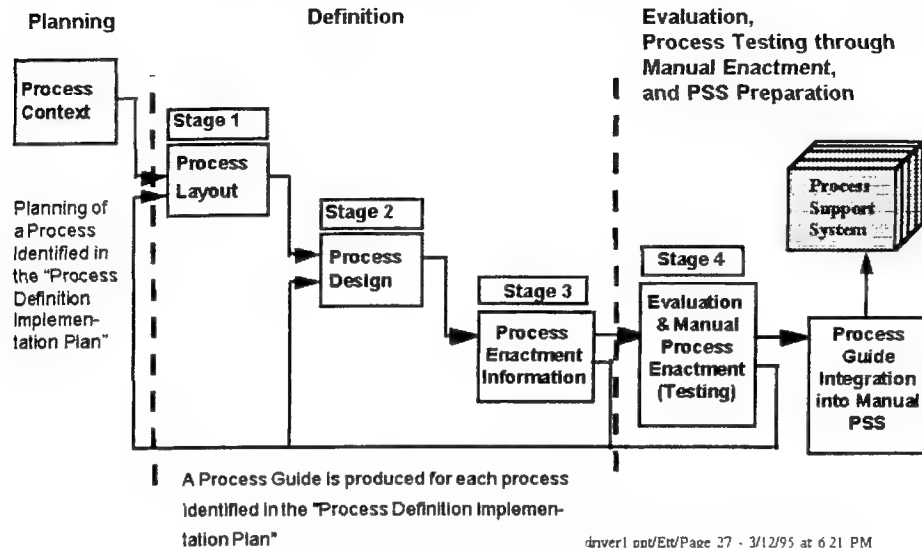
Exercise illustrated key differences of the "project process" and "organization processes"

- *Organization processes* developed to address process assurance criteria of the CMM
 - Software project management processes
 - Technical service processes
- *Cleanroom Process* - prepared specifically to support the *technical management* and development of software projects:
 - Life cycle specific way of doing business
 - Defect prevention
 - Statistical usage testing

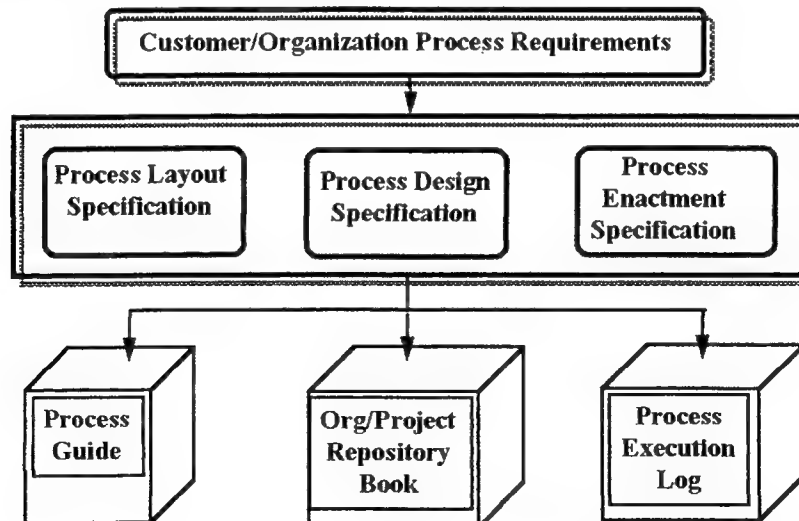
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Process Definition, Evaluation & Use

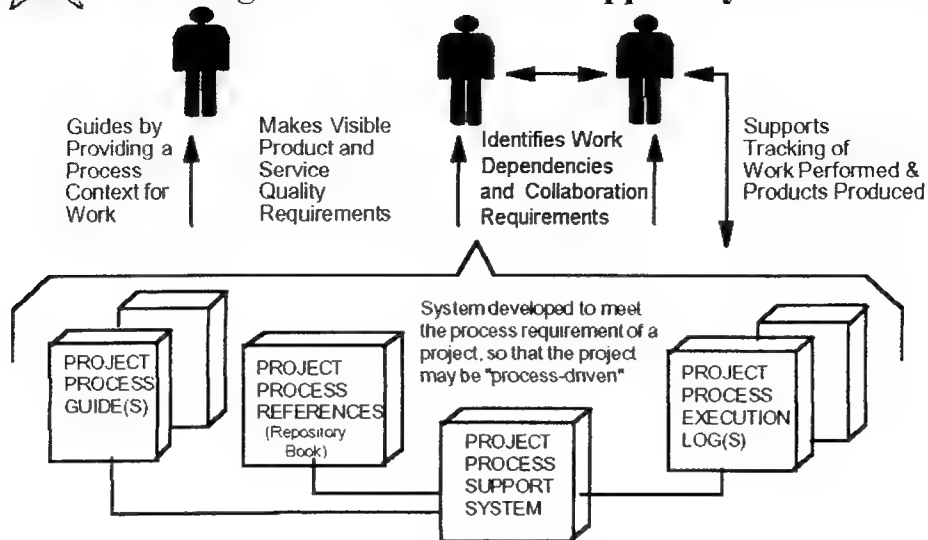


Process Definition Products





Defining a Manual Process Support System



Note: Figure Depicts a Manual Process Support System for a Project



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Process Definition Planning

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Process Definition Planning

Concepts

- Analyzing the Requirements for the Project Process
- Preparing the Project Process Architecture
 - SCAI Project Example
- Preparing the Phased Definition Plan
- Using the Process Architecture to Support Process-Driven Project Planning

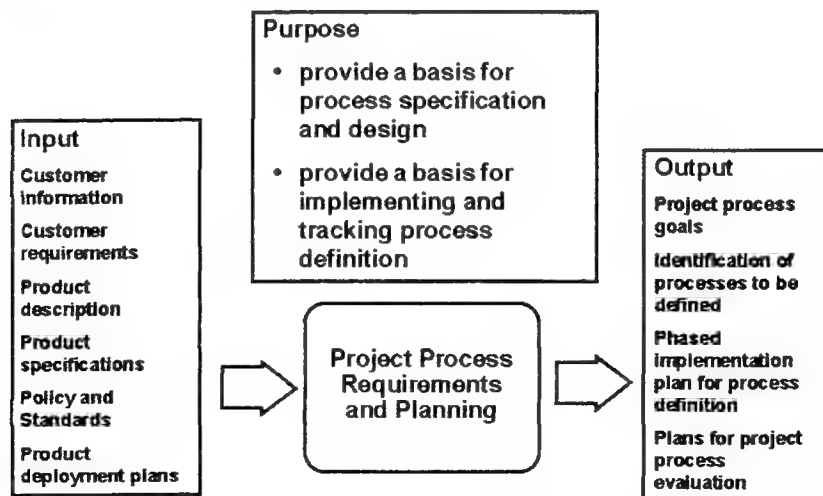
Focus

- Project Process Definition
- Approach applied on the Air Force STARS Demonstration Project

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Project Process Requirements & Planning



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Process Definition as a Project Activity

Project process definition is a vital part of an engineering project and must be planned

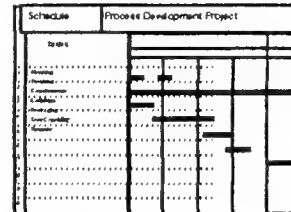
- Process Definition efforts may be organized as a project within a project

Examples:

- process action teams
- business process re-engineering

Successful process definition efforts:

- are planned and tracked
- follow a defined process as the basis for planning
- are staffed, reviewed, approved, etc.

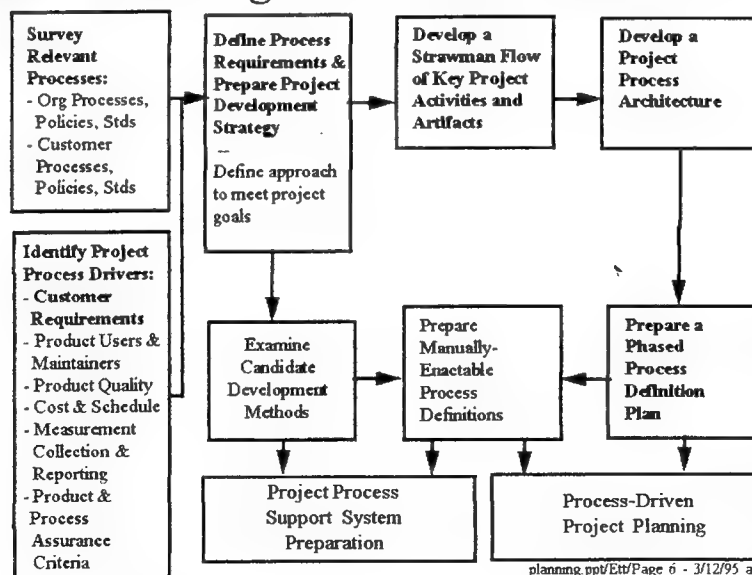


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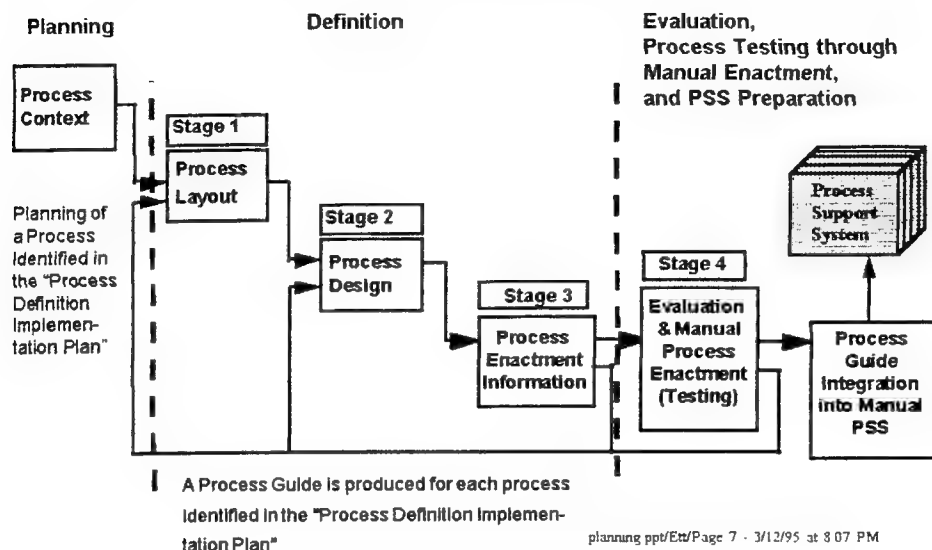
Planning for Process Definition



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Process Definition, Evaluation & Use



Survey Relevant Processes

Project process definition teams must identify what processes have been defined

Potential Sources:

- Site SEPG
- SEI:
 - SEI Software Process Frameworks for levels 2 through 5 (ETVX description of each CMM V1.1 KPA)
- STARS *ASSET*:
 - Keeper of the SEI/STARS Process Assets
 - Cleanroom Process Guidebooks
 - Ada Process Model Guidebook
 - AT&T Quality Function Deployment Process
- Customer:
 - Standards and Product DIDs



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Identify Project Process Drivers



- Product/system requirements
- Cost
- Schedule
- Customer processes, policies, and development standards
- Customer's definition of product quality
- Developer Process Assurance

- Organization processes, policies, practices, standards, methods, etc



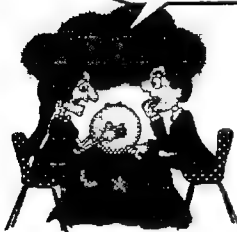
Do you see any problems with the requirements we got from the customer?

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Identify Project Process Drivers



I see a system deployed that is incredibly slow, and cannot be easily ported to your customer's other machines.



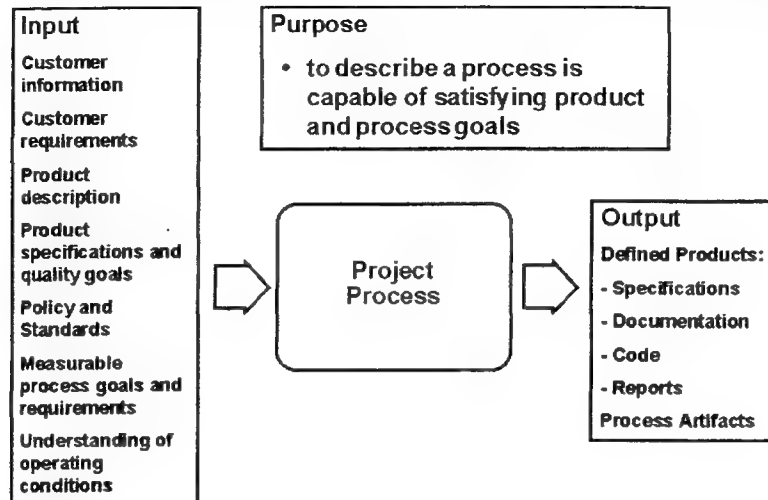
We forgot to tell the contractor **what?** Who's gonna want to use this new system ...

- Operating environments
- How and where the target system will be used
- How the target system will be maintained and by whom

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Defining Project Process Requirements



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Defining Project Process Requirements

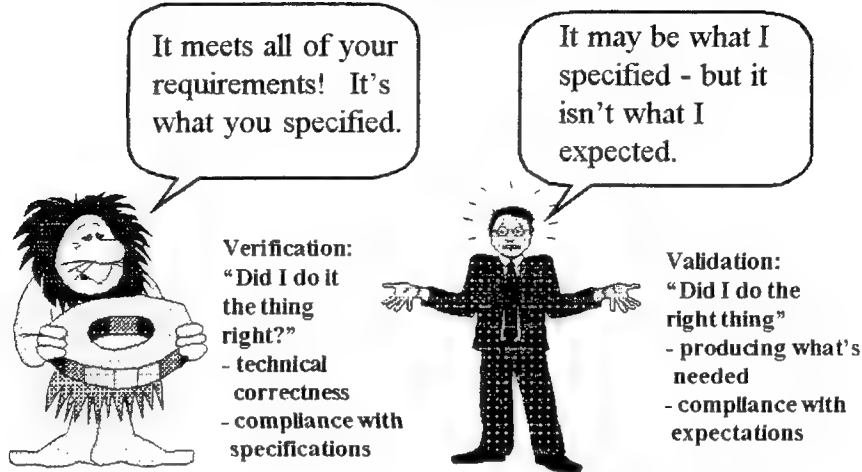
Requirements for the Project Process:

- How will we *verify and validate* the specified work products?
 - Verification - Is our work *technically correct*?
 - Validation - Is the system we built *what the customer wanted*?
- How will customer and contractor management *assess* work progress?
- How and when will status be *reported* to support project control?
- What *measurements* must be taken and what *metrics* must be computed? How will they be reported and when?

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Verification and Validation Requirements: A Project Process Concern



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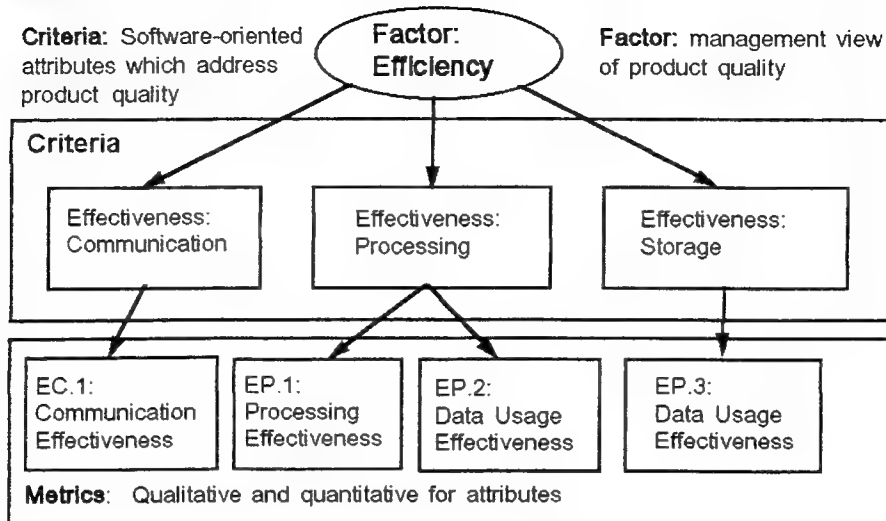


RADC Quality Framework

Criterion \ Factors	Efficiency	Integrity	Reliability	Survivability	Usability
Accuracy			X		
Anomaly Mgt			X	X	
Autonomy				X	
Distributedness				X	
Effectiveness: Comm.	X				
Effectiveness: Proc.	X				
Effectiveness: Stor.	X				
Operability					X
Reconfigurability				X	
System Accessibility		X			
Training					X

This table illustrates a portion of the RADC quality framework factors and associated criteria. Factor/criteria pairing is used to identify data collection forms and associated metrics for use in process instrumentation.

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Prepare Project Development Strategy

Risk Factors:

- Problem domain understanding
- Technology maturity
- Precedence with respect to past systems
 - Unprecedented (first time out)
 - Precedented (instances have been built)

Development Approaches Selected to Manage Risk:

- Spiral framework
 - Prototyping
 - Incremental development
- Waterfall framework



Defining the Project Process Architecture

What is a "Project Process Architecture"

A framework of the process components required to satisfy a project's process requirements

The "Project Process Architecture" defines:

- The components of the project process and their relationships from a "black box" perspective:
 - Process components inputs and outputs
 - Process component black box behavior
- The interfaces between process components

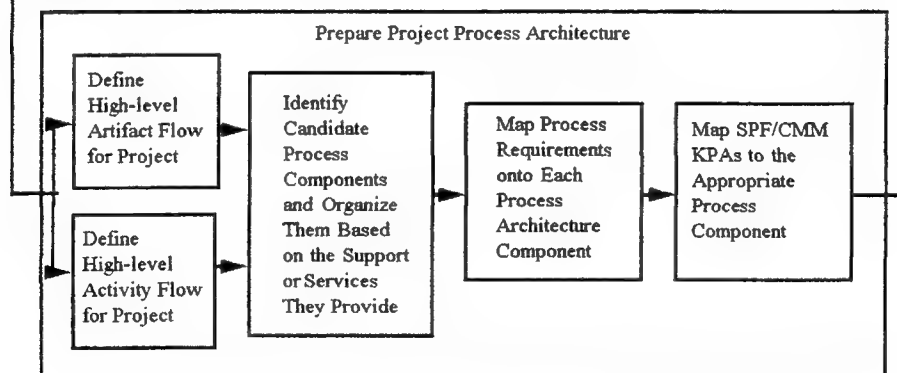
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Defining the Project Process Architecture

Process Requirements +
High level Technical Approach +
Expected Management Approach

Project
Process
Architecture



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Defining the Project Process Architecture

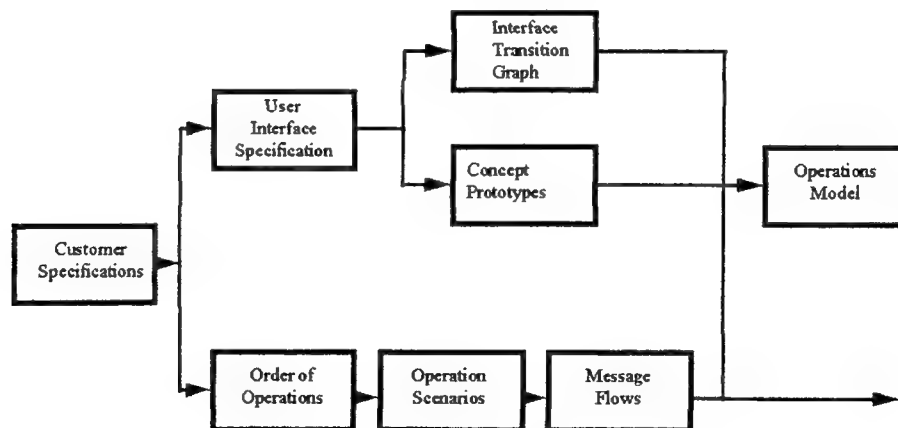
After the "Project Process Architecture" is defined, it becomes the basis for:

- **Process Definition Planning**
 - Understand what processes to reuse, tailor or develop
 - Basis for phasing the definition of project processes
- **Process Requirements Allocation**
- **Process Assurance Planning**
 - Understand which process components must address SEI CMM V1.1 or ISO-9000.2 criteria

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Artifact flow for preparing an "Operations Model"

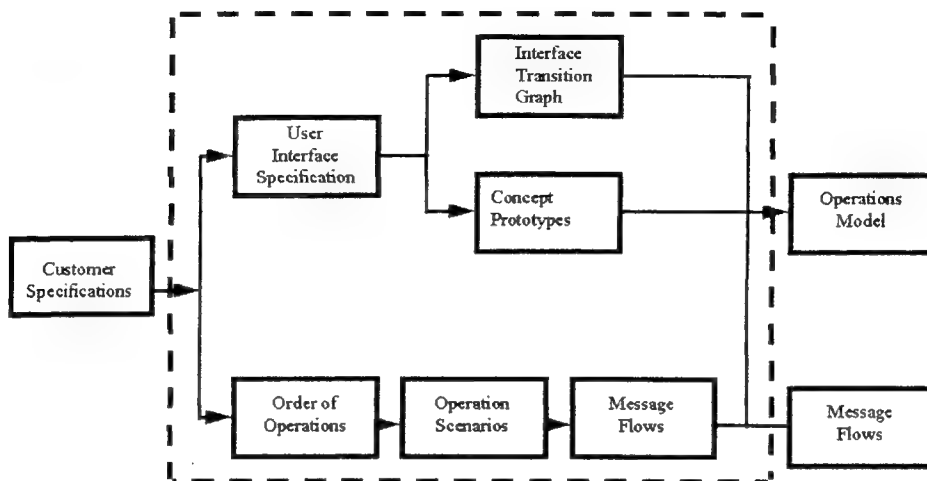


Example from "Developing with Ada. Life Cycle Methods" by Bruce E. Krell. Bantam Professional Books

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Process Component: "Operations Model Development"

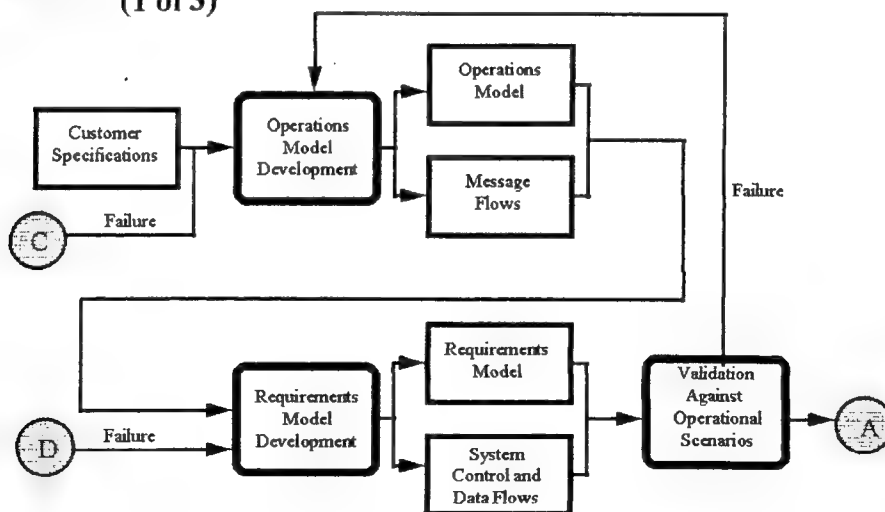


Example from "Developing with Ada. Life Cycle Methods" by Bruce E. Krell. Bantam Professional Books

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Activity Flow: "Ada R/T Software Engineering Process" (1 of 3)

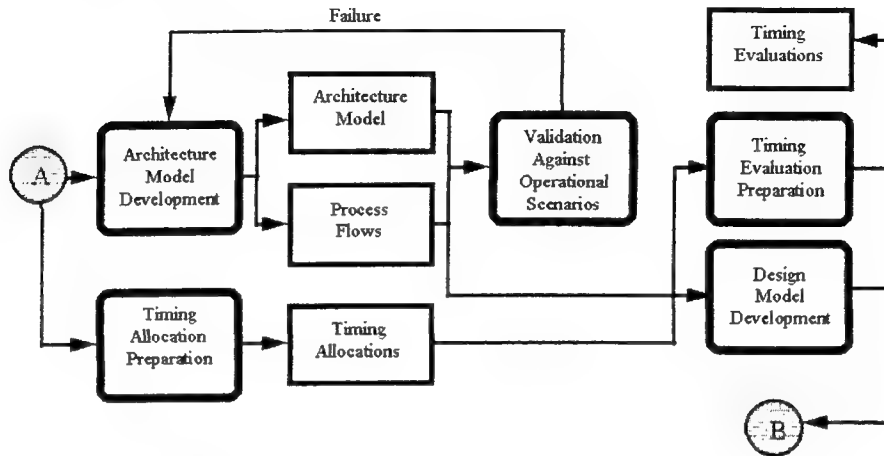


Example from "Developing with Ada. Life Cycle Methods" by Bruce E. Krell. Bantam Professional Books

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Activity Flow: "Ada R/T Software Engineering Process" (2 of 3)

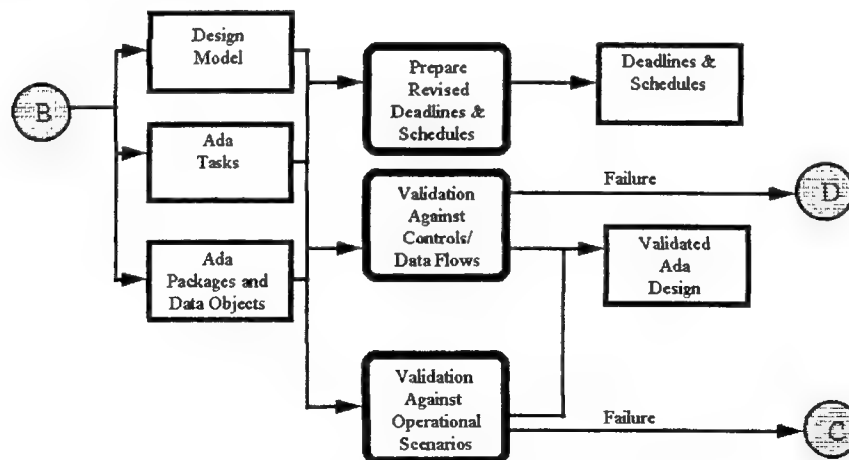


Example from "Developing with Ada. Life Cycle Methods" by Bruce E. Krell. Bantam Professional Books

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Activity Flow: "Ada R/T Software Engineering Process" (3 of 3)

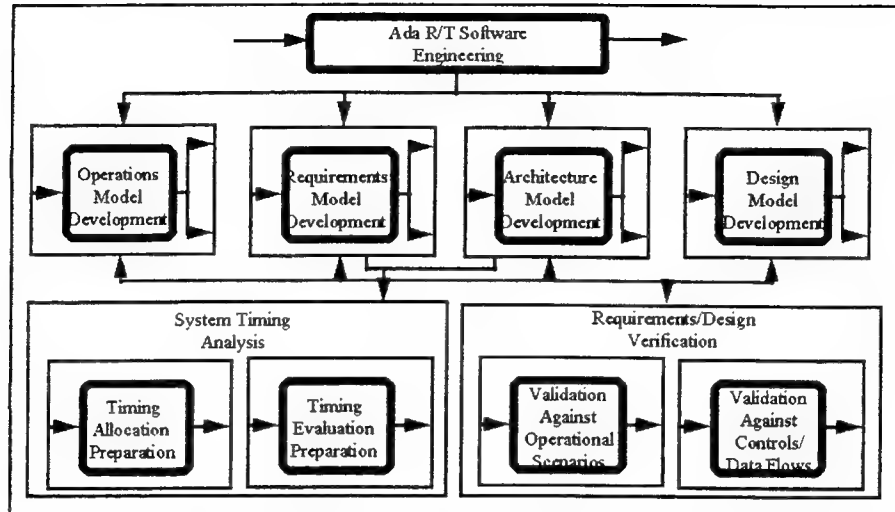


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Process Architecture

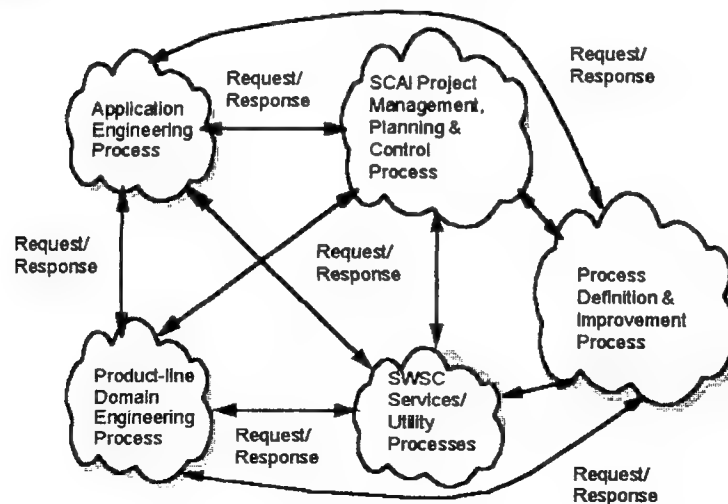


Example from "Developing with Ada Life Cycle Methods" by Bruce E. Krell, Bantam Professional Books

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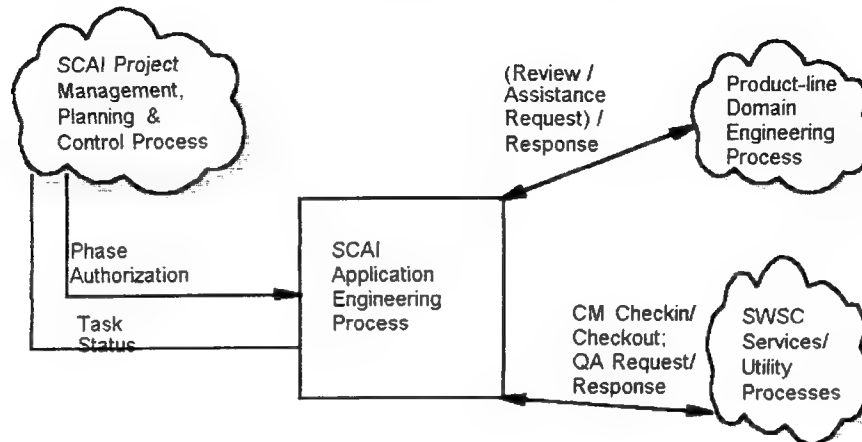
SCAI Process Architecture Concept



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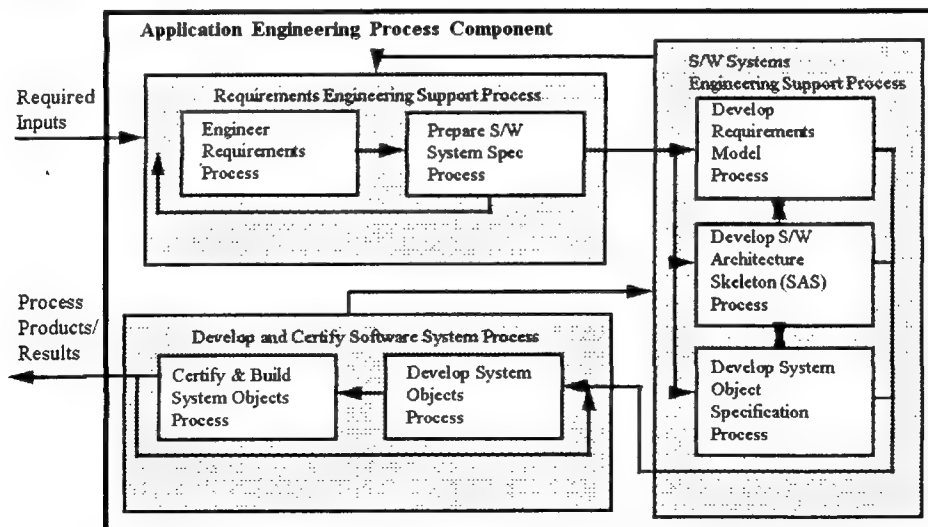
SCAI AE Development Strategy



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SCAI Application Engineering Process



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Phased Process Definition Plan

Preparation Phase	Processes Required to Support Work Increments
SCAI Increment 1 (90 days prior to project start)	<ul style="list-style-type: none">o Requirements Engineering Process (OBE)o System Specification Development Processo SAS Development Processo Requirements Model Development Process
SCAI Increment 2 (120 days prior SCAI release 1 development)	<ul style="list-style-type: none">o System Object Specification Development Processo System Object Development Processo System Object Certification Process
SCAI Increment 3 (120 days prior to SCAI release 2 development)	<ul style="list-style-type: none">o System Object Integration & Build Processo System Certification Process (Outside of AEP)...

Example from the SCAI Project "Phased Process Definition Plan " for Application Engineering

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Process Driven Project Planning (1)

Node Id: 747 Application Engineering	Node Id: 7525 Process Extension	Node Id: 7875 Perf Sys Eng	Node Id: 7775 Req & Specs	Node Id: 7795 Proc System Spec	Node Id: 16050 S/W Quality Assurance
Node Id: 5545 SW Project Mgt	Node Id: 7875 Dis Sys Arch	Node Id: 7815 Dev SW Impl	Node Id: 7704 Build & Cert S/W	Node Id: 6055 Dev Sys Spec	
Node Id: 19081 Project Site Services					

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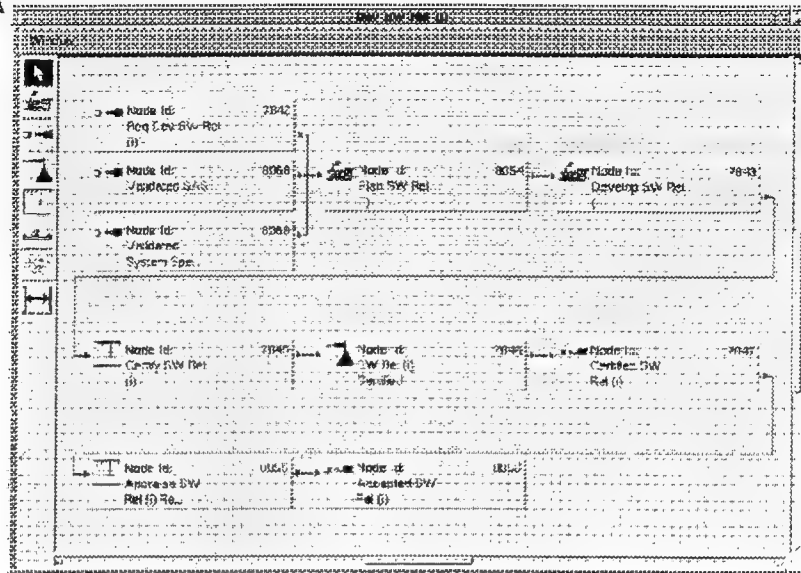
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Process Driven Project Planning (1)

Window		SCM AP	
<input checked="" type="checkbox"/> Node Id: 7747 Application Engineering	<input checked="" type="checkbox"/> Node Id: 7525 Process Exception	<input checked="" type="checkbox"/> Node Id: 8045 S/W Project Mgt	<input checked="" type="checkbox"/> Node Id: 18681 Project/Site Services
<input checked="" type="checkbox"/> Node Id: 8016 Perf Sys Eng	<input checked="" type="checkbox"/> Node Id: 7778 Requirements Eng	<input checked="" type="checkbox"/> Node Id: 7806 Dev Sys Arch	<input checked="" type="checkbox"/> Node Id: 7841 Dev S/W Rel (I)
<input checked="" type="checkbox"/> Node Id: 7798 Prep System Spec	<input checked="" type="checkbox"/> Node Id: 18680 S/W Quality Assurance	<input checked="" type="checkbox"/> Node Id: 8030 Doc Sys Spec (I)	<input checked="" type="checkbox"/> Node Id: 7834 Build & Cert Sys



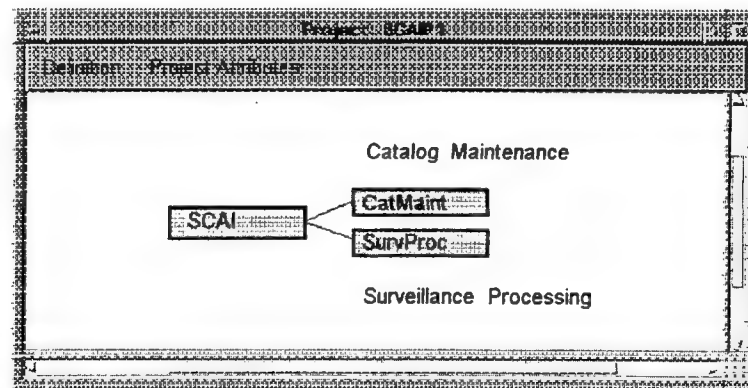
Process Driven Project Planning (2)



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Process Driven Project Planning (3)

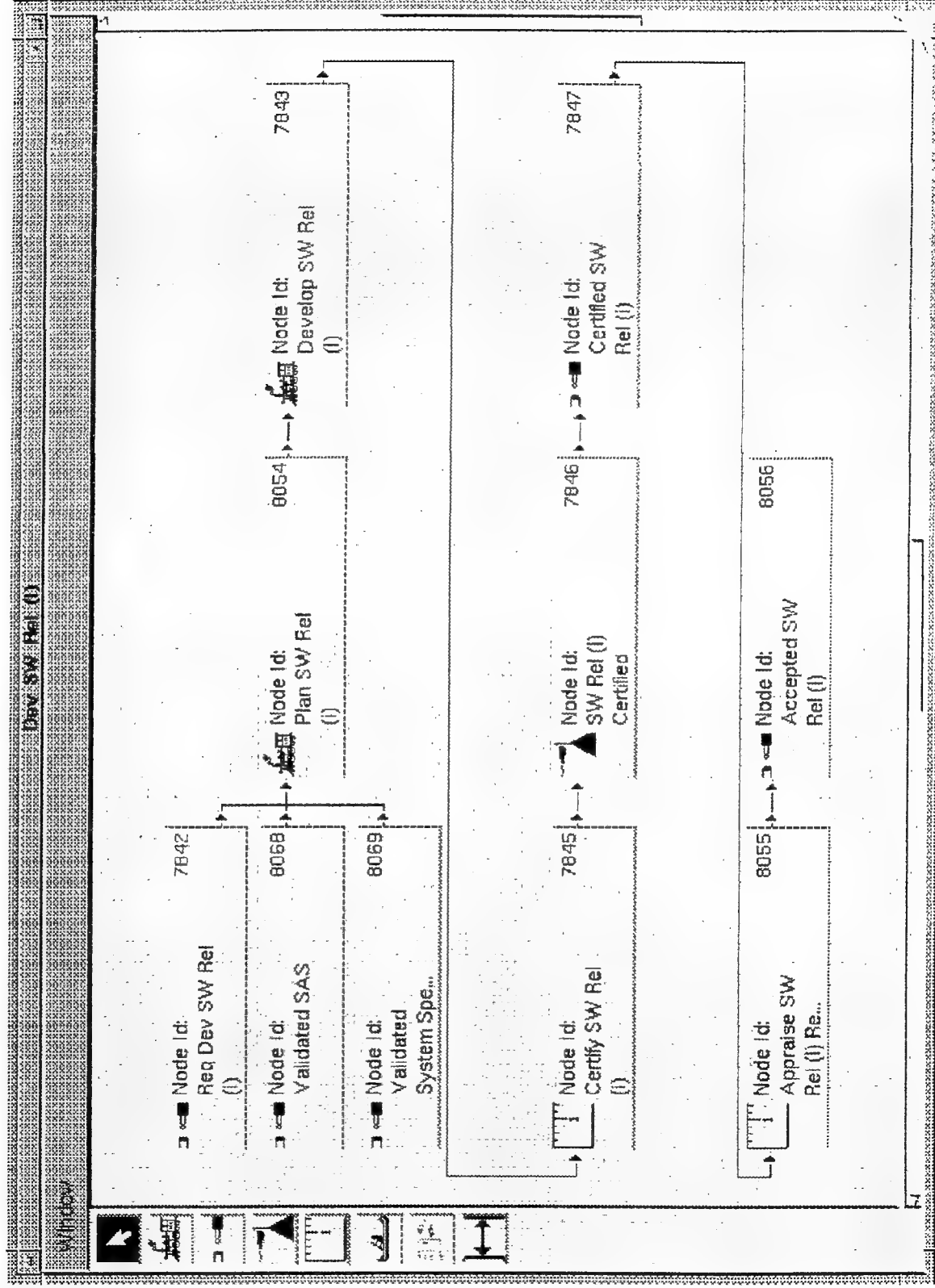


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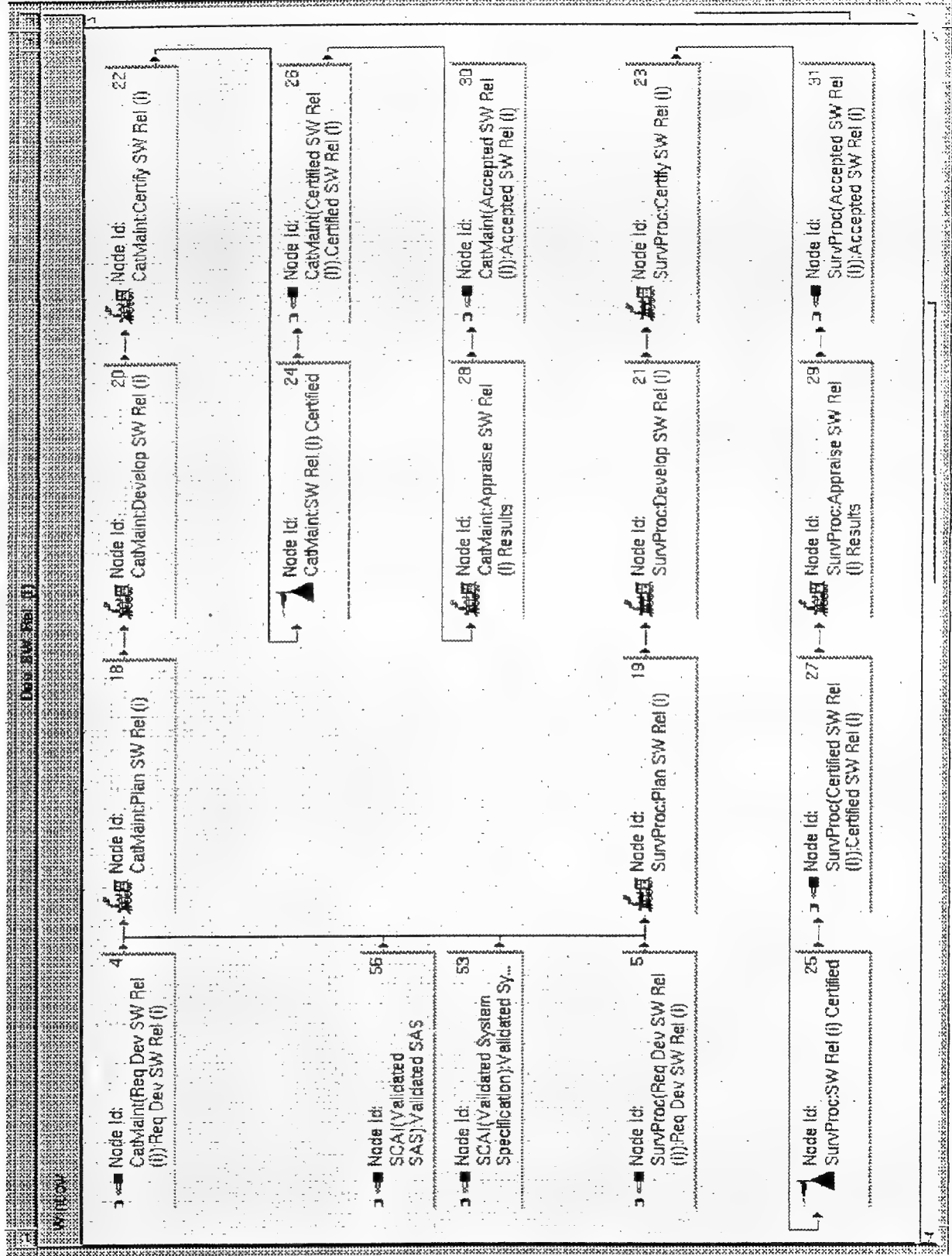
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Process Driven Project Planning (2)





Process Driven Project Planning (4)





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Tutorial Contents

- 1 - Introduction**
- 2 - Process Definition Concepts**
- 3 - Planning the Project Process**

Definition

- ★ **4 - Process Context**
- 5 - Process Layout Specification**
- 6 - Process Design Specification**
- 7 - Process Enactment Information Specification**

Evaluation

- 8 - Evaluating Process Definition Results**

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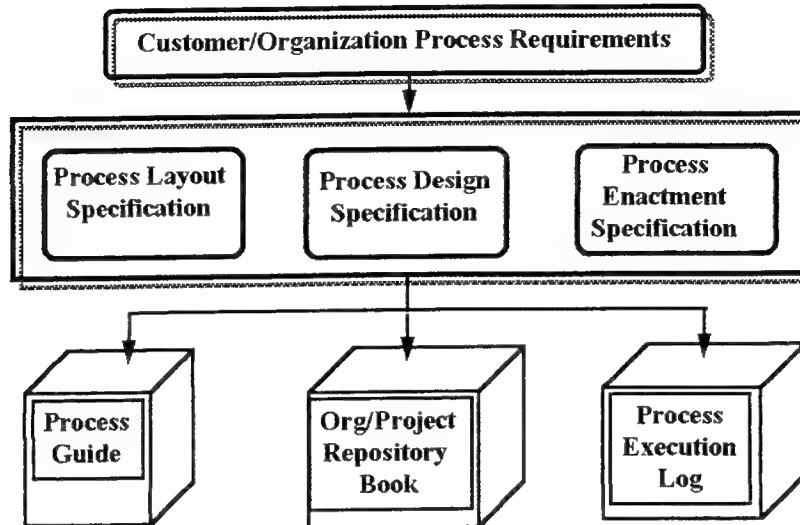
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Process Context

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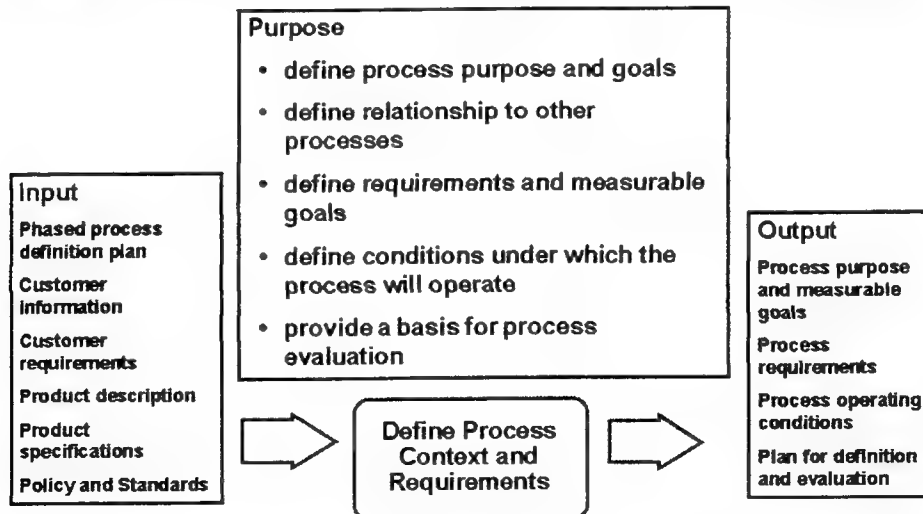
Process Definition Products



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Process Context & Requirements Definition



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Process Context

Process Guide	
Process Context Section	
<p>Overview:</p> <p>Process Purpose:</p> <ul style="list-style-type: none">- What will following this process accomplish?- Does following this process satisfy its intended purpose? <p>Process Goals:</p> <ul style="list-style-type: none">- Goals this process addresses <p>Process Context:</p> <ul style="list-style-type: none">- Relationship of this process with others	

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Process Context

Process Guide	
Process Context Section (Continued)	
<p>Process Requirements:</p> <p>Required Inputs (Artifacts, messages, controls, etc.)</p> <p>Process Work Results (Products and services)</p> <ul style="list-style-type: none">- Quality attributes of each work product and service <p>Measurement requirements</p> <ul style="list-style-type: none">- Process measurements and metrics- Product measurements and metrics <p>Reporting Requirements</p> <ul style="list-style-type: none">- Normal reporting and exception reporting	

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Process Context: Artifact Quality Attributes

Product	User Product Quality Factor	Product Quality Criteria
Space Catalog Software Component	Reliability	Accuracy Simplicity
	Usability	Operability Training
	Correctness	Completeness Consistency Testability Traceability

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Process Context

Organization/Project Repository Book
Process Context Section (Continued)
<p>Process Operating Environment:</p> <p>Process Audience:</p> <ul style="list-style-type: none">- Who (roles) are the intended users of this process?- What are their current responsibilities? <p>Process Usage:</p> <ul style="list-style-type: none">- How will each audience use this process definition? <p>Benefits:</p> <ul style="list-style-type: none">- What benefits will users realize after using the process?

Source "Developing Useful Documents," American Institute for Research, 1990 layout ppt/Ett & Phillips/Page 8 - 3/12/95 at 8:55 PM



Process Context

Organization/Project Repository Book

Process Context Section (Continued)

Process Audience and Experience:

- How new is what you are telling them?
- What vocabulary do they use?
- How do they think about this topic or the tasks involved?
- What do they need to know before using the process

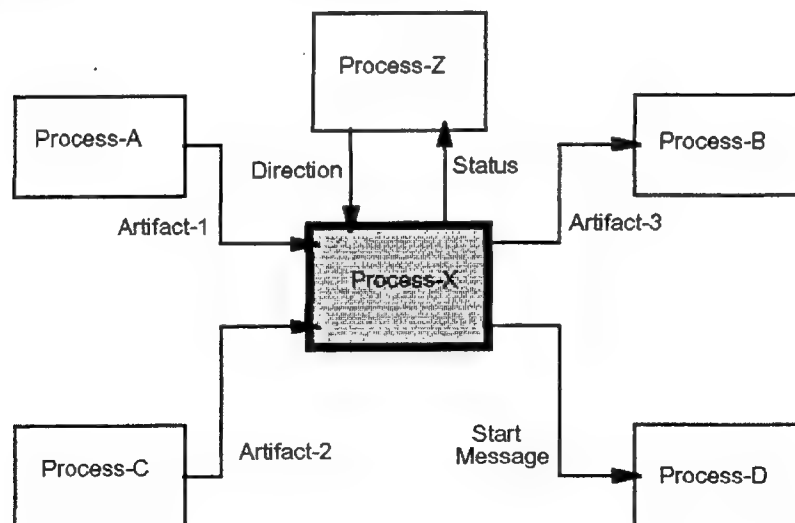
Process Audience Motivation:

- How much effort are they willing to put into learning understanding what the process definition requires of them?

Source "Developing Useful Documents," American Institute for Research, 1990 layout ppt/Ett & Phillips/Page 9 - 3/12/95 at 8 55 PM



Process Context



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Next Step: Process Layout

- Complete process context for assigned process
- Identify and define artifacts
- Define agent roles
- Graphically depict process layout
- Verify that activity and artifact granularity is OK

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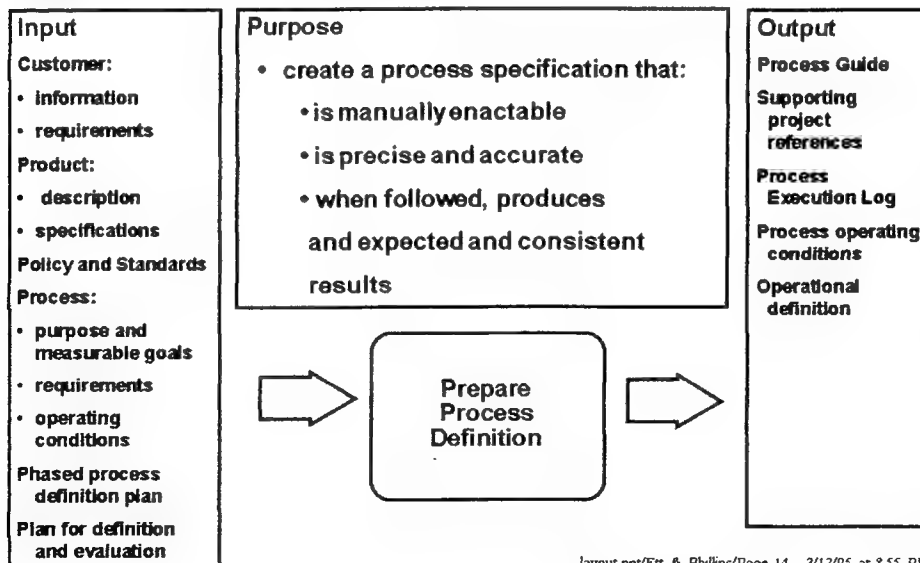


Process Layout Specification

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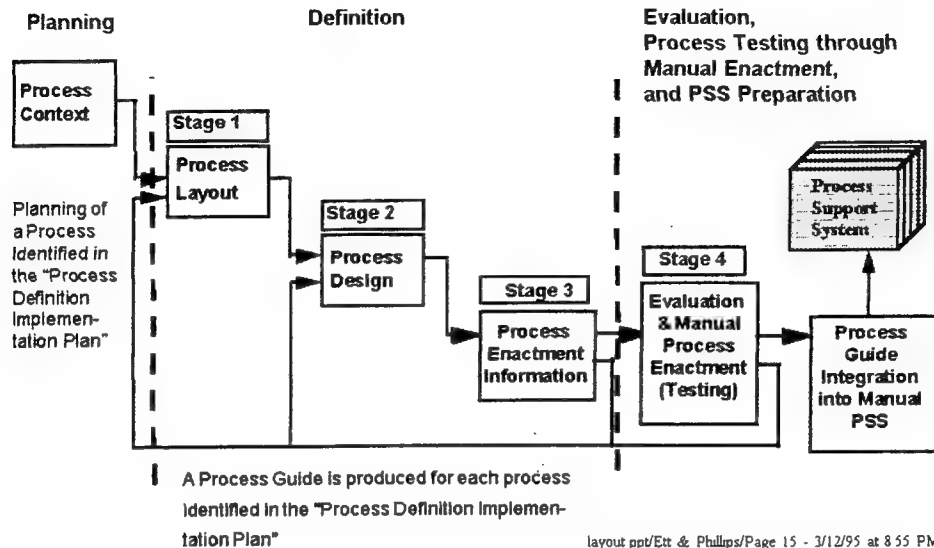
Process Definition



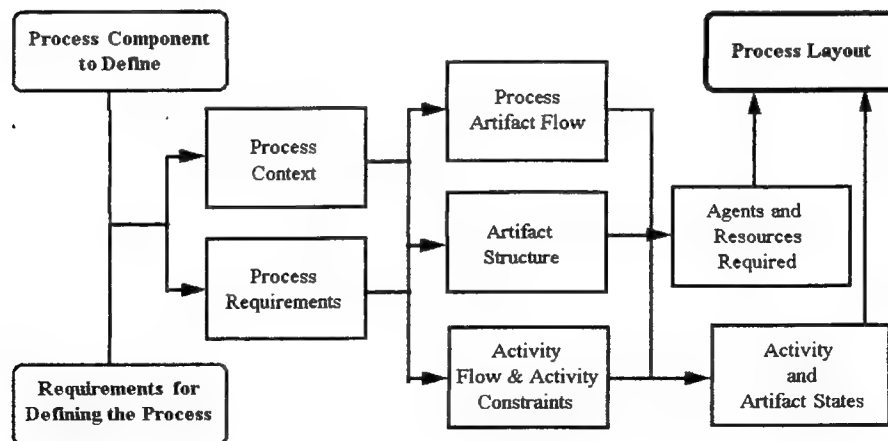
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Process Definition, Evaluation & Use

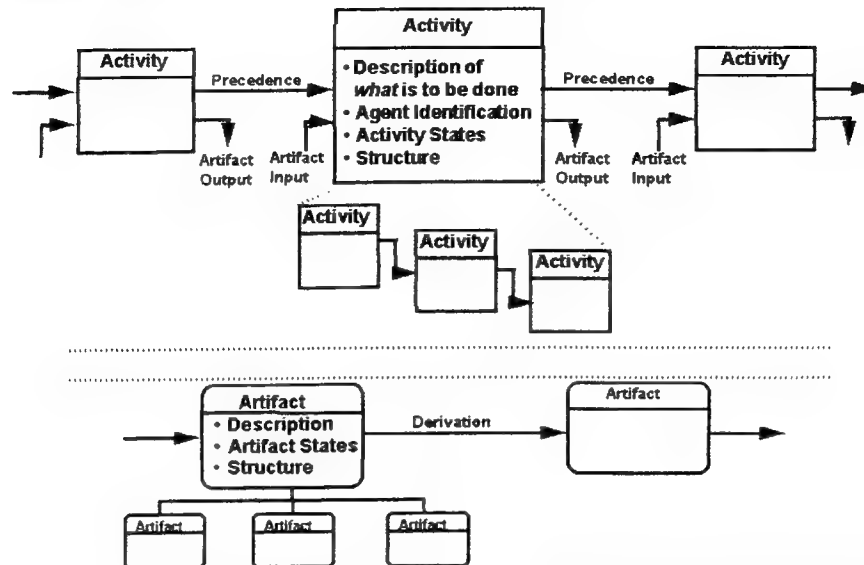


Process Layout Objectives





Process Layout Information



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Describing the Artifacts of a Process

The important features of an artifact that should be described are:



Relationships	Behavior	Attributes
<ul style="list-style-type: none">• structure and content• derivation• used or produced by activity• used or produced by agent	<ul style="list-style-type: none">• artifact state• allowable state transitions	<ul style="list-style-type: none">• purpose• description• requirements, goals, and measures• applicable specifications or standards

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Artifact Structure

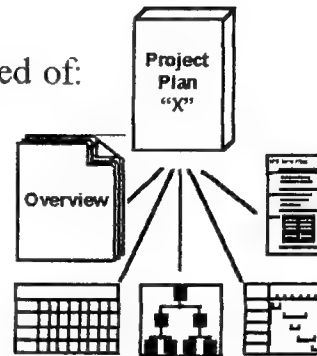
Describes the parts (components) of an artifact

- Artifact composition (part/subpart)

Artifact parts may themselves be artifacts

Example: Project Plan “X” is composed of:

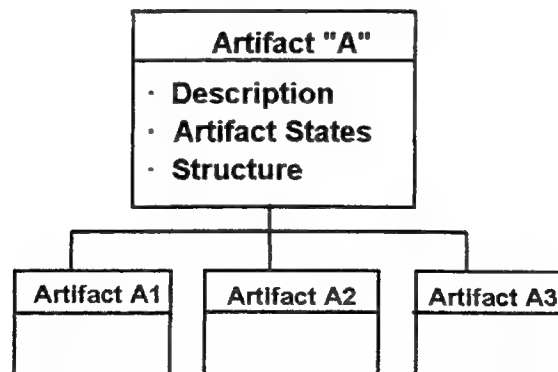
- Overview section
- Work breakdown structure
- Size, effort, and cost estimates
- GANNT chart
- Methods/procedures



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Artifact Structure



Artifact "A" has subparts "A1," "A2," and "A3."

Artifact "A1" is a subpart of Artifact "A."

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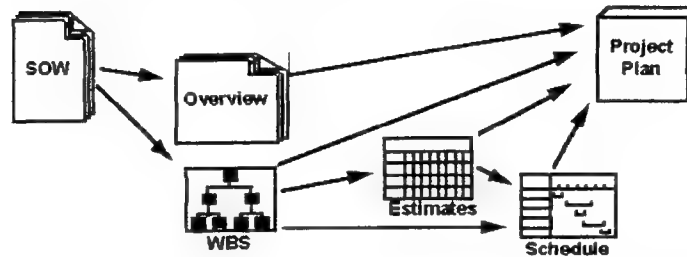


Artifact Derivation

Describes precedence order based on the use of one artifact to derive another

For example:

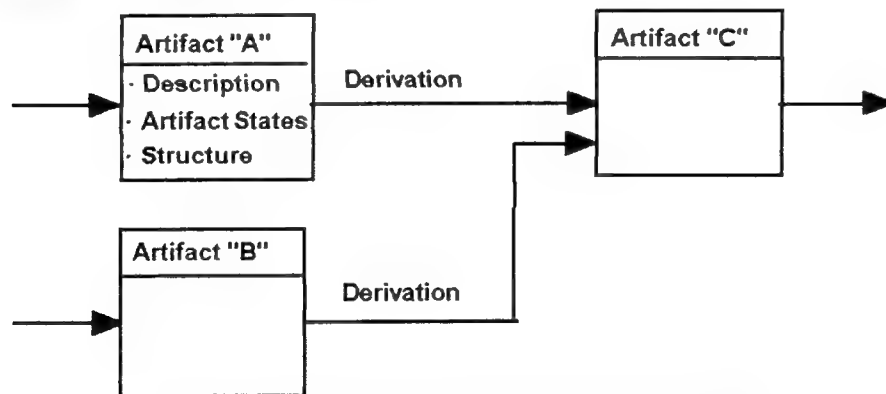
- Project estimates are based on the WBS
- Project schedule is derived from the project effort estimates and the WBS



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Artifact Derivation



Artifact "C" is derived from Artifact "A" and "B"

Artifact "A" is used to derive Artifact "C"

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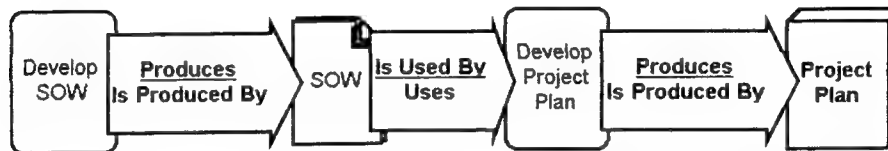


Artifacts Used and Produced

Activities have *inputs* and produce *outputs*

Examples of this relationship:

- Activity Develop Project Plan uses artifact SOW
- Activity Develop Project Plan produces Project Plan
- Artifact SOW is used by Develop Project Plan
- Artifact Project Plan is produced by Develop Project Plan



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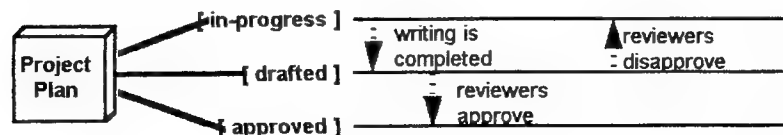


Artifact State

- Describes the phases (or states) of an artifact
- Transitioning from artifact state to artifact state describes the evolution of the artifact in the process

Example:

A project plan evolves from *in-progress* to *drafted*, and then to either *approved* or *in-progress*



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Describing the Activities of a Process

The important features of an activity that should be described are:



Relationships	Behavior	Attributes
<ul style="list-style-type: none">artifacts used and produceddecomposition into sub-activities or proceduresdependencies among activitiesactivity control flowperforming agent	<ul style="list-style-type: none">activity stateentry criteriaexit criteria	<ul style="list-style-type: none">purposedescriptiongoals and measuresapplicable policies

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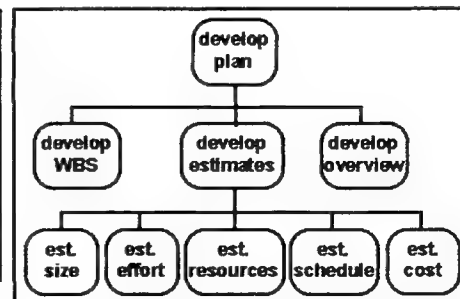
Activity Decomposition

Activities are decomposed into steps that are:

- Lower level sub-activities (tasks)
- Methods or procedures

Example:

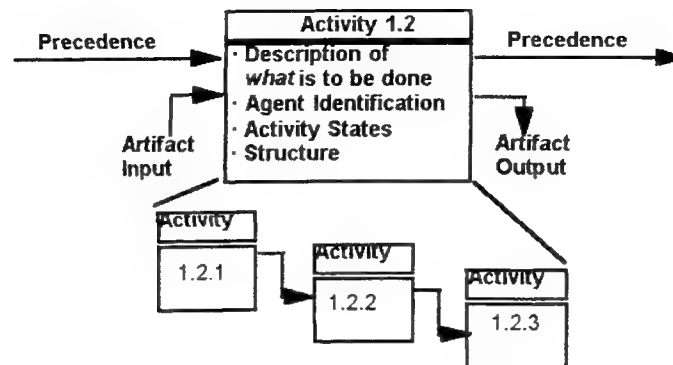
1. Develop plan
 - 1.1 Develop WBS
 - 1.2 Develop estimates
 - 1.2.1 Estimate size
 - 1.2.2 Estimate effort
 - 1.2.3 Estimate resources
 - 1.2.4 Estimate schedule
 - 1.2.5 Estimate cost
 - 1.3 Develop overview



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Activity Decomposition



Activity 1.2 has sub-activities 1.2.1, 1.2.2, and 1.2.3

Activity 1.2.1 is a sub-activity of 1.2

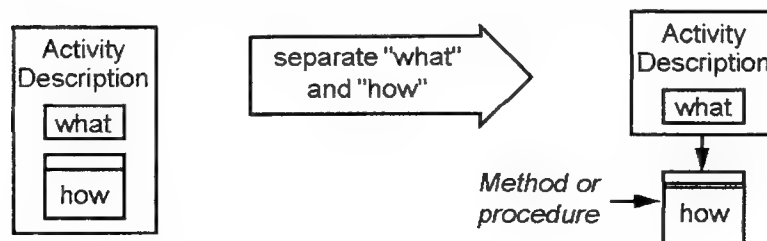
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Separating "What" and "How"

An activity is described by specifying:

- "what" happens and "how" it is done
- The "how" component of an activity description should be defined in a method or procedure description separate from the activity description



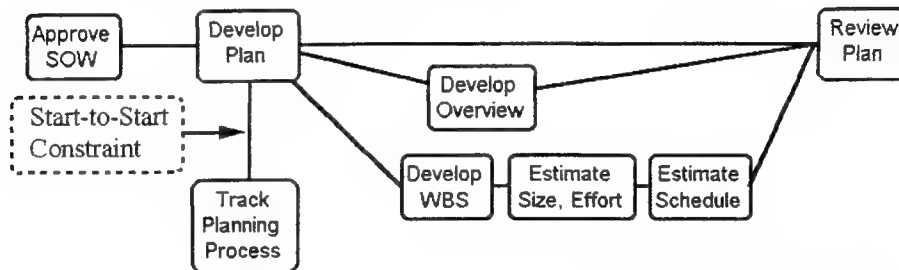
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Activity Dependencies

Activity dependencies arise from:

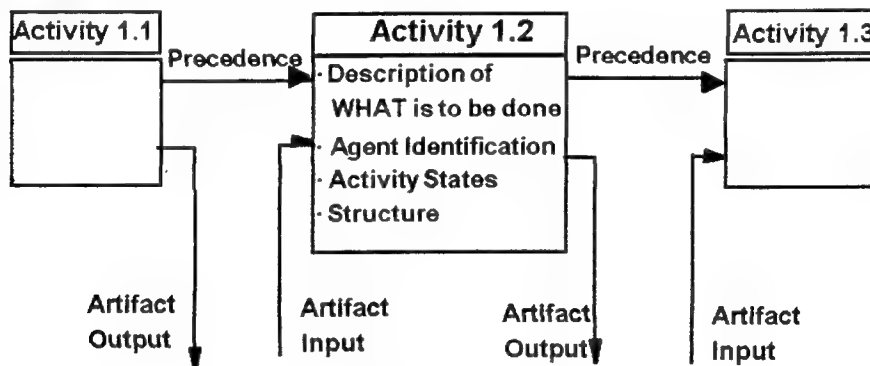
- Artifact state or use, as well as activity state
- Decomposition of activities
- Coupling of activities
- Activity constraint relationships



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Activity Precedence



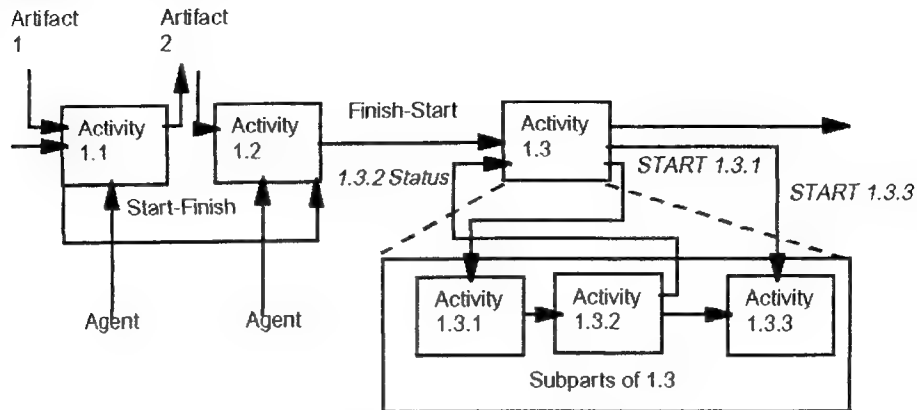
Activity 1.1 comes before Activity 1.2

Activity 1.2 comes after Activity 1.1

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Activity Control



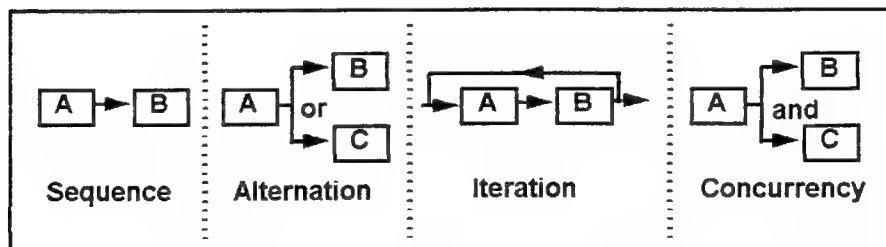
Activity 1.3 controls 1.3.1, 1.3.2 and 1.3.3.

Activity 1.3.1 is controlled by 1.3.



Activity Flow Relationships

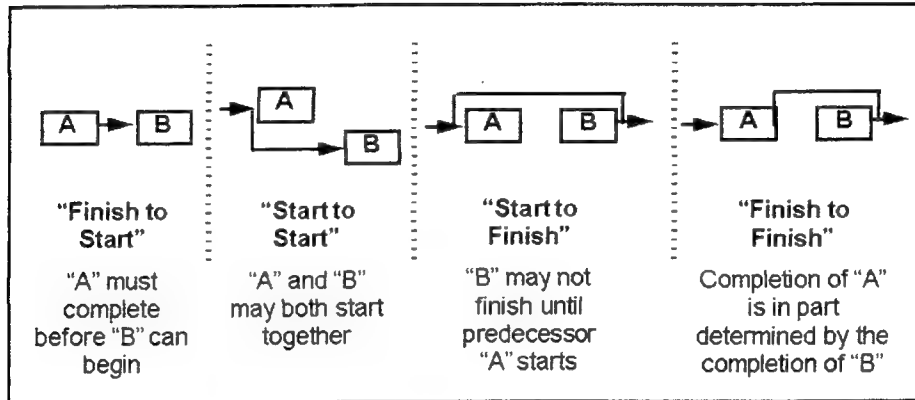
Activity flow describes the static order of Activities





Activity Flow Relationships

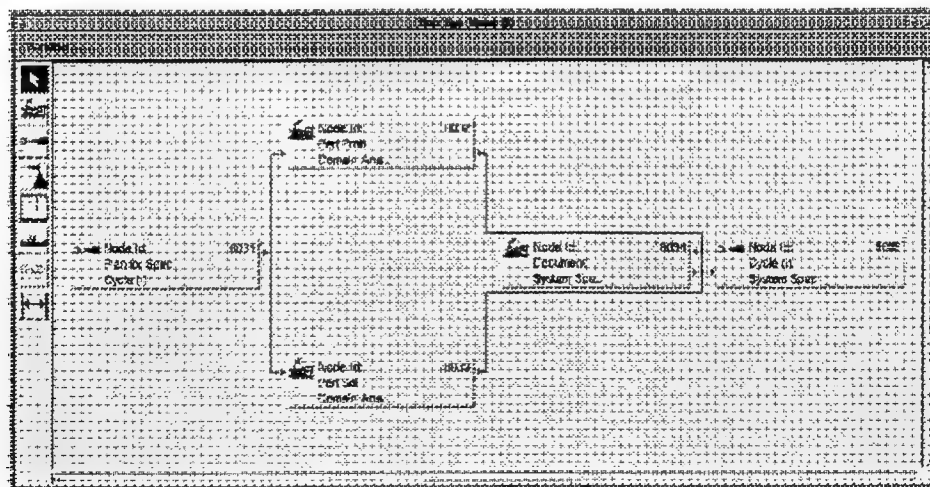
Activity flow also describes the relationships and constraints between activities



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Activity Flow Relationships



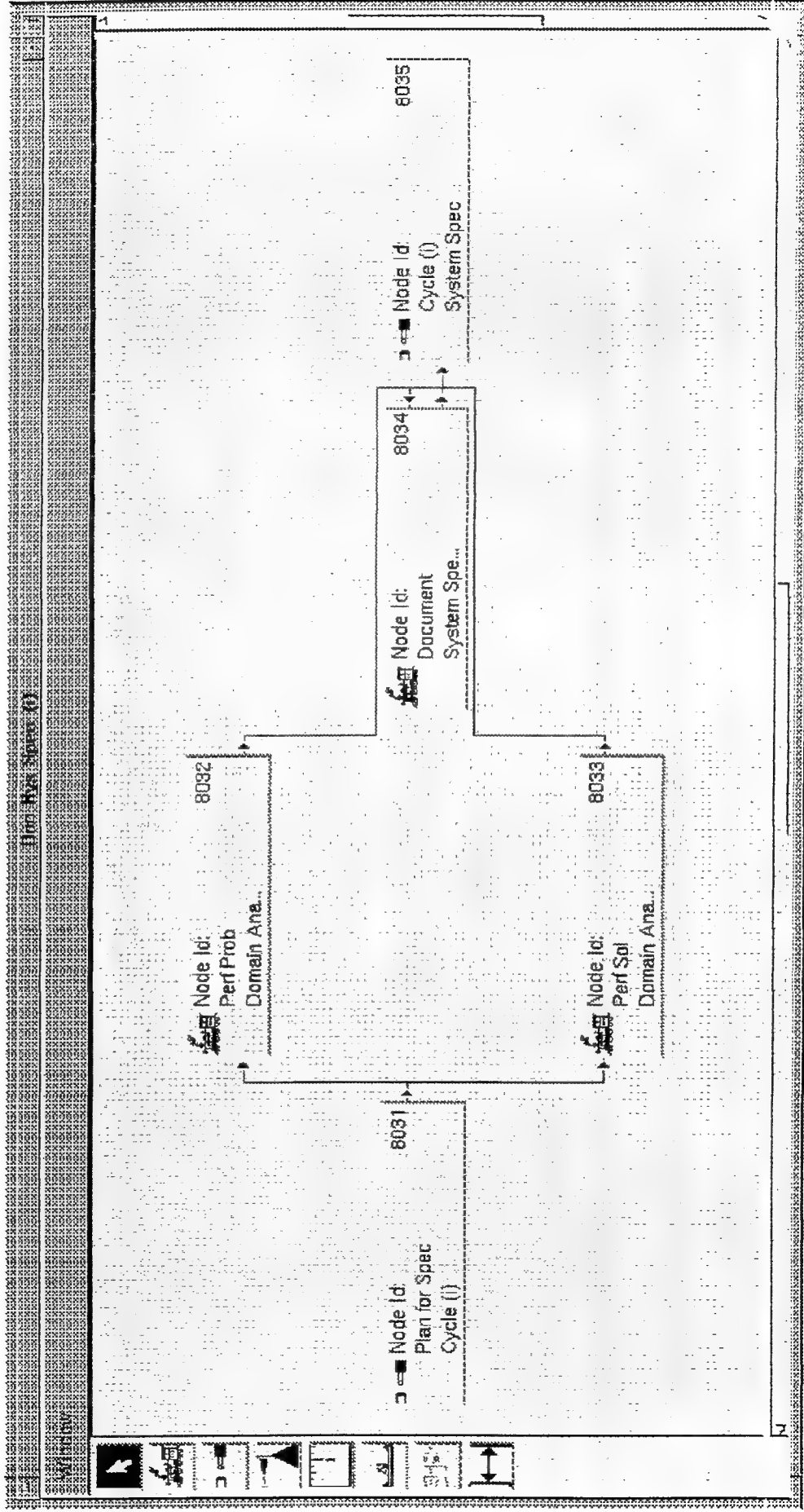
"Finish to Finish" Link Example

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Activity Flow Relationships



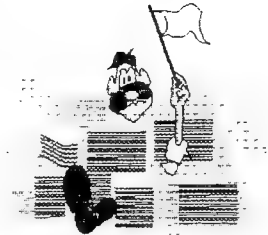
“Finish to Finish” Link Example



Parallelism Considerations

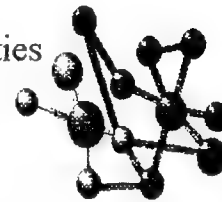
Typical software developer's state:

- Many activities in progress
- Few activities completed
- Tendency toward activity completions
"bunching up" at major checkpoints



Process definer:

- Eliminate unnecessary serial dependencies
- Seek opportunities to enable multiple activities
to be performed asynchronously
- Synchronize at milestones as necessary



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Layout Granularity Considerations

- Some granularity factors
 - Single Agent
 - Method intricacy
 - Practitioner expertise
 - Availability of subprocesses/methods
 - Characteristics of subprocesses/methods
 - Goals/purpose
 - Process/product state change logging points
 - Communication/navigation decision points
 - Project planning support requirements

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Process Layout

Process Guide	
Process Layout Section	
Graphic Representation	
<ul style="list-style-type: none">• Artifact Goal State Map (artifact derivation flow)<ul style="list-style-type: none">• Artifact structure• Artifact precedence• Activity Network<ul style="list-style-type: none">• Activity hierarchy• Activity precedence• Activity relation to artifacts (inputs/outputs)	

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Process Layout

Process Guide	
Process Layout Section	
Textual Representation	
<p>For each activity of the process:</p> <ul style="list-style-type: none">• Activity description• Identification of supporting methods and states they may change• Identification of required resources• Identification of agents (roles) to perform/support the activity	

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Process Layout

Organization/Project Repository Book	
Artifacts and Goal States Section	
Artifact Goal States	
<p>For each artifact, identify:</p> <ul style="list-style-type: none">• Artifact state variables• Allowable state transitions	

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Layout Example

Refer to "*Process Definition Information
Organizer Instructions*" Manual

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Next Step: Process Design

For the assigned process:

- Verify that activity and artifact granularity is OK
- Completely describe all artifacts
- Completely describe all roles and their skill and experience requirements
- Define all required method descriptions



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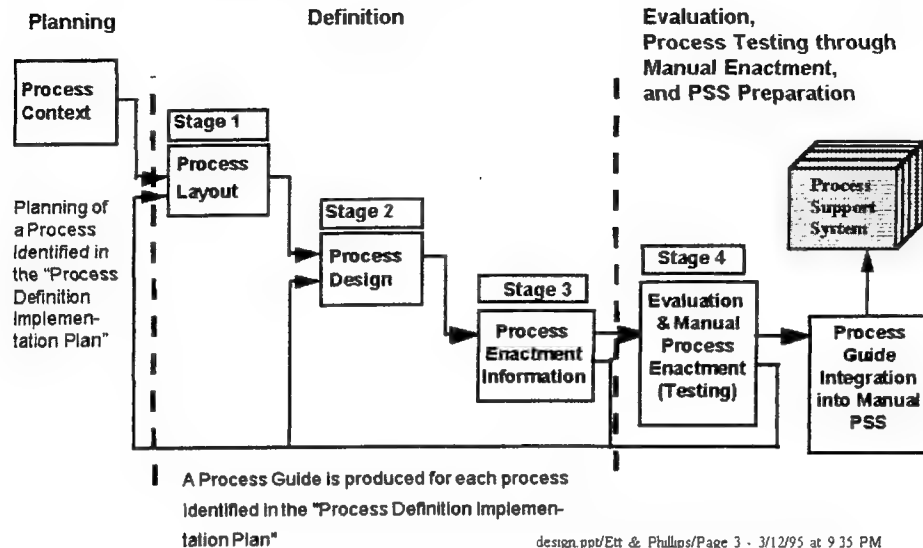
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Process Design Specification

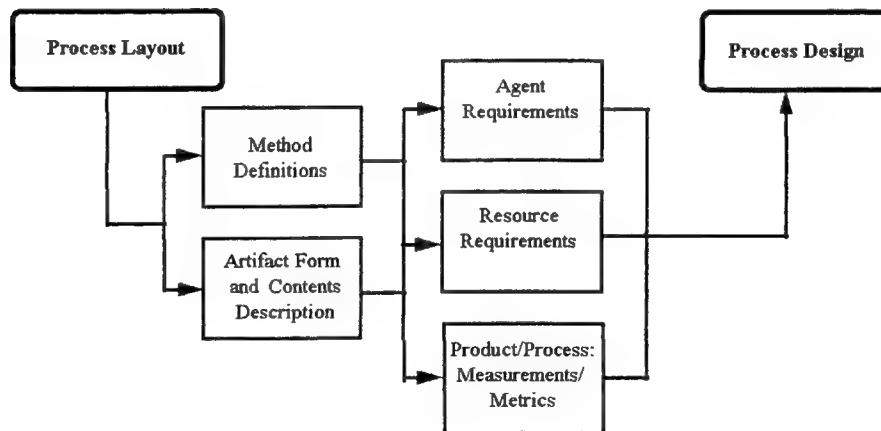
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Process Definition, Evaluation & Use

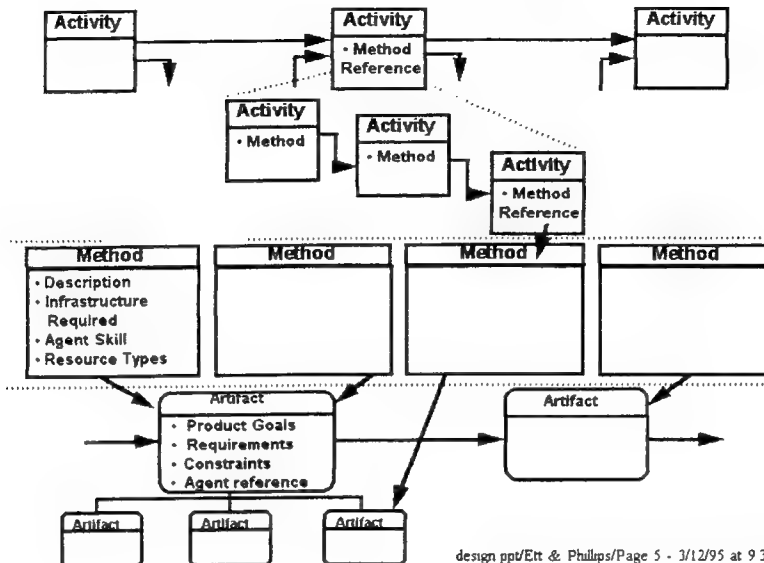


Process Design Objectives





Process Design Information



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Describing the Agents of a Process

The important features of an agent that should be described are:



Relationships	Behavior	Attributes
<ul style="list-style-type: none"> • organizational structure • activities performed • artifacts used and produced 	<ul style="list-style-type: none"> • availability 	<ul style="list-style-type: none"> • role • skills required • training required

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Roles

Process definer: lays out the process, defines it, and creates the Process Guide

Practitioner: follows or executes/enacts the process definition

– Executive, Manager, Team Leader, QA, Engineer, etc.

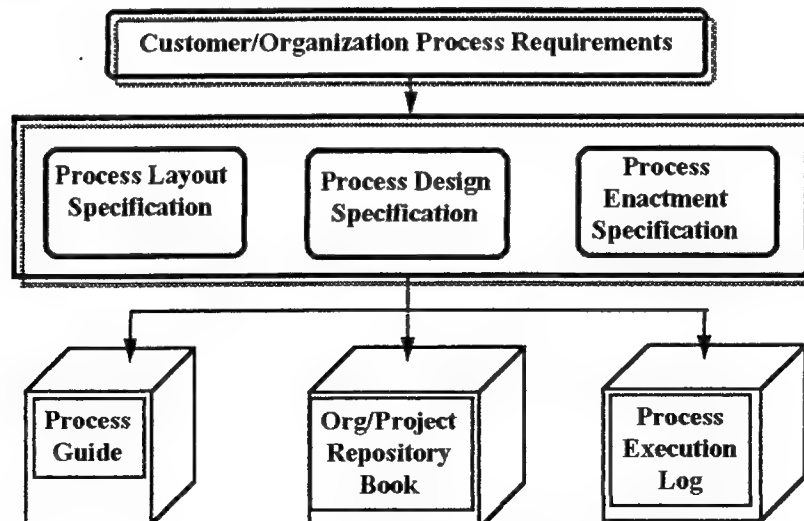
Monitor: tracks and evaluates status and progress, anticipates future state

– Executive, Manager, Team Leader, QA, Engineer, etc.

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Process Definition Products



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Process Design

Organization/Project Repository Book

Artifacts and Goal States Section

Artifact Descriptive Information

- Artifact Purpose and scope
 - Artifact Goals
 - Artifact hierarchical structure (layout)
 - Reference to artifact specification (Artifact DID)
 - Artifact organization
 - Artifact contents
 - Artifact constraints
- Examples: Product standards, Drop dead dates, etc.

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Process Design

Organization/Project Repository Book

Artifacts and Goal States Section

Artifact Owner and Constraints

- Artifact Owner/Author (role identification)
- Artifact Reviewer and Approvers (role identification)
- Artifact access privileges and constraints
- Reference to artifact specification (Artifact DID)
 - Artifact organization
 - Artifact contents

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Process Design

Organization/Project Repository Book

Artifacts and Goal States Section

Artifact Owner and Constraints (Continued)

- Artifact constraints
 - Access permissions
 - How used/maintained
 - Who uses/maintains
- Artifact metrics to compute and collect

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Process Design

Organization/Project Repository Book

Methods Section

Method Descriptive Information

- Method objectives
- Inputs used
- Outputs produced

Infrastructure Requirements

- Agent requirements (requisite skills, method training)
- Organizational and management support required
- Process system support functions required

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Process Design

Organization/Project Repository Book

Methods Section (Continued)

Method Enactment Information

- How to achieve the objectives of the method
- How to report results

Agent Description Section

Agent role description

General experiences and skills required for the role

Types of resources the role requires



Design Example

Refer to Information Organizer Instructions



Next Step: Enactment Information Specification

- Add enactment work paradigm steps
- Draft "Process Guide"
- Refine granularity
- Refine detailed methods
- Complete "Process Guide"



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Evaluation

- 8 - Evaluating Process Definition Results**

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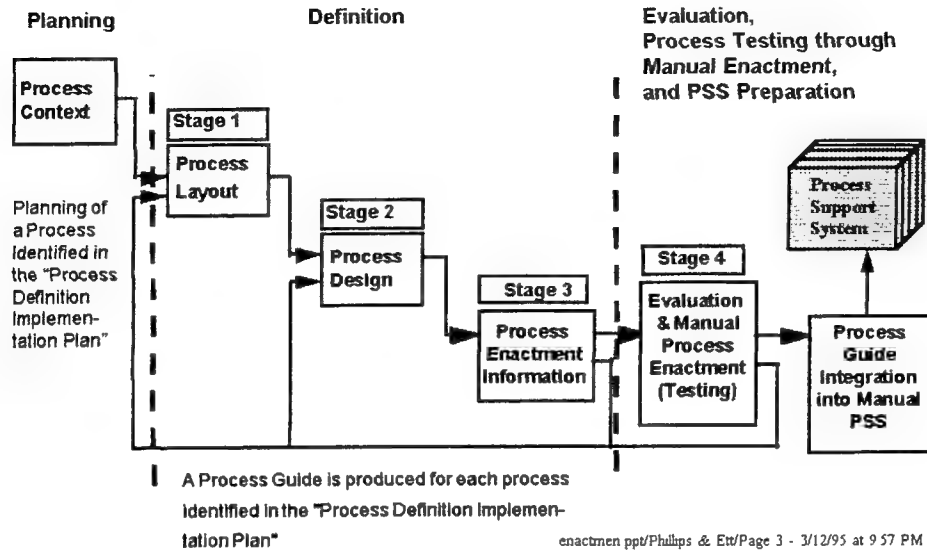
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Process Enactment Information Specification

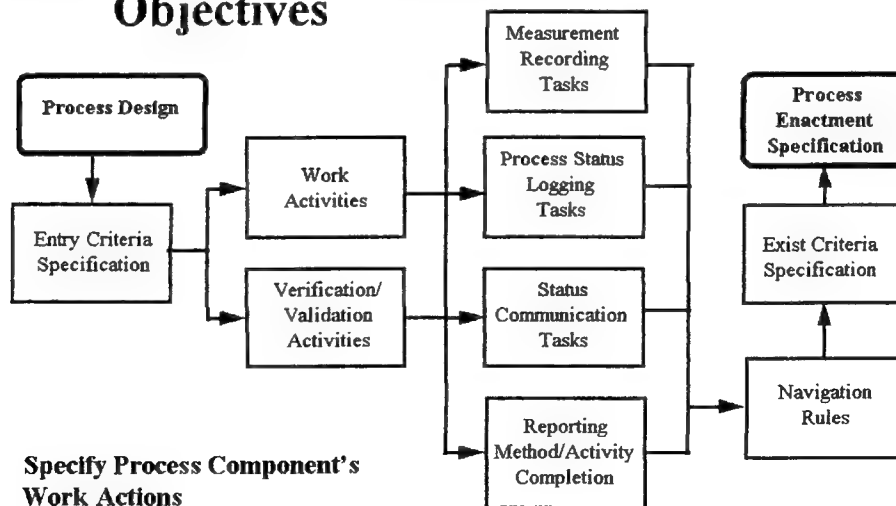
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Process Definition, Evaluation & Use

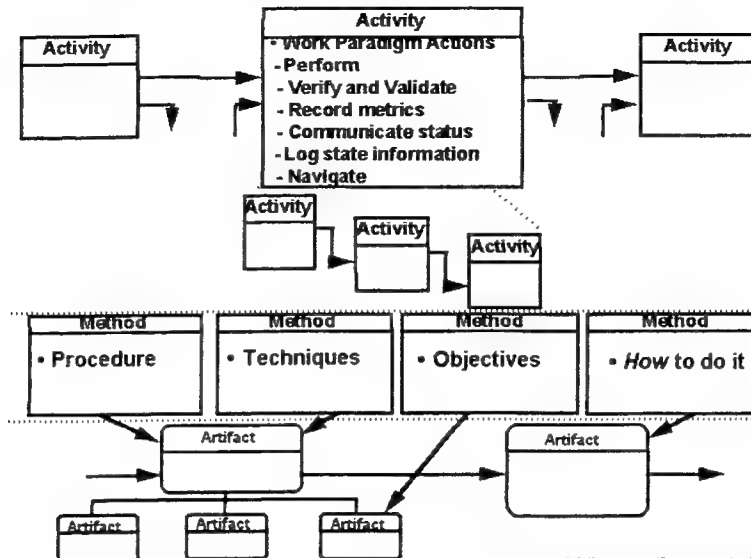


Process Enactment Specification Objectives





Process Enactment Information



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Concept of a Work Paradigm

Work Paradigm

- Common set of actions to be performed within each activity
- General case across an organization or project

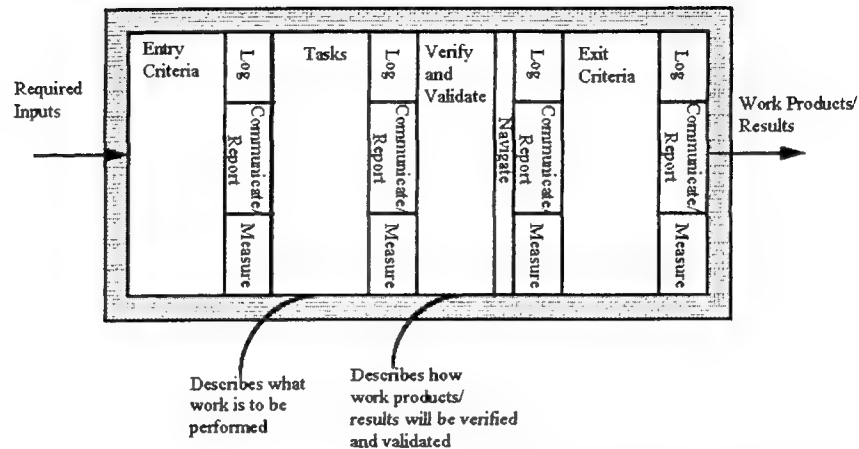
Example: "ETVX" paradigm

- Test Entry criteria
- Perform Task
- Verify/validate results
- Test eXit criteria

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Extended ETVX Process Description



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Example Work Paradigm Actions

Performing main task and logging Artifact state information for future navigation decisions

Verifying results against internal criteria

Validating results according to recipient needs

Recording process and product metrics for future improvement or contractual needs

Testing Exit Criteria and logging Activity status

Communicating status to/from dependent work

Navigating to next defined activity based on current process/product state

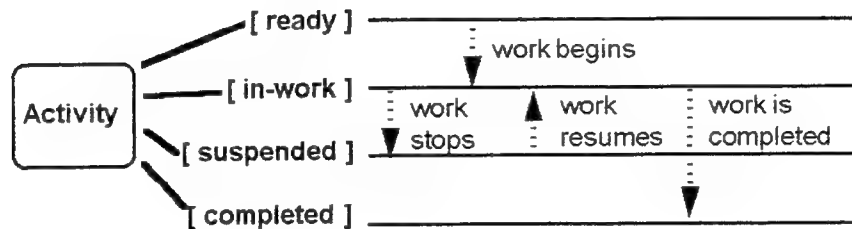
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Activity State and Allowed Transitions

Activity state can generally be described with these four states and the transitions:

- Ready
- In-work
- Suspended
- Completed



Activity Entry and Exit Criteria

Entry criteria define the conditions under which an activity is allowed to begin

Exit criteria define the conditions under which an activity can be declared complete, and are generally based on:

- Completion of an activity or output
- Availability of an input or agent
- Satisfaction of evaluation criteria
- State of an activity, artifact, or agent



Concepts of Behavioral Adaptability

Exceptions to prescribed process definition stem from real-life events

Process definition must carry adequate information to accommodate these situations

Example of process navigation needs that require behavioral adaptability:

- Iteration
- Rework
- Workahead

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Mixed Initiative Considerations

Typical developer situation from following *information-based, creative* processes such as software development or product engineering:

- Many activities in progress
- Few completed
- Parallelism the norm

To support "real life" process pragmatics:

- Support/encourage *workahead* by means of *permissive Entry Criteria*
- Enable *management control* through dependency network of *rigid Exit Criteria*

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Optimal & Mandatory Entry Criteria

Entry criteria are either *optimal* or *mandatory*

Optimal entry criteria are those that *should* be met before the activity begins, but may be deferred to allow work-ahead

Mandatory entry criteria are those that *must* be met before the activity begins

Deferred entry criteria must be *satisfied before* the activity may be declared complete

Note: *exit criteria should always be mandatory*



Process Enactment

Process Guide

Process Enactment Section

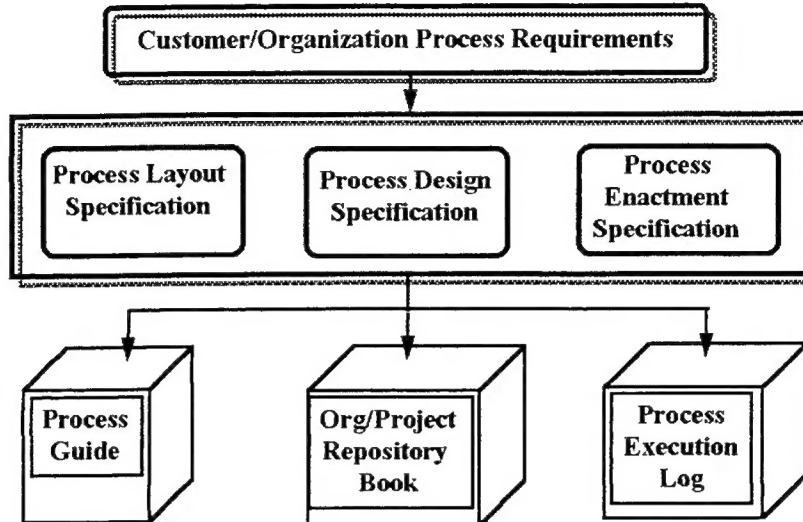
For each activity in the process, specify -

Activity Work Paradigm Actions:

- Test the entry criteria
- Perform the activity main task
- Verify main task results
- Validate main task results
- Record measurements and metrics
- Communicate process status
- Navigate to next activity



Process Definition Products



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Enactment Information Example

Refer to "*Process Definition Information Organizer Template*" Instructions Manual

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Next Steps

- Complete enactment information
- Complete detailed methods
- Complete all artifact DIDs
- Complete Process Guides
- Prepare Project References and Execution Logs
- Review Process Guide, Organization/Repository Book entries, and Process Execution Log
 - Revise as appropriate
- Evaluate all process definition products

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Tutorial Contents

- 1 - Introduction
- 2 - Process Definition Concepts
- 3 - Planning the Project Process

Definition

- 4 - Process Context
- 5 - Process Layout Specification
- 6 - Process Design Specification
- 7 - Process Enactment Information Specification

Evaluation

- ★ 8 - Evaluating Process Definition Results

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Evaluating Process Definition Results

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Discussion

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